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AND

COAL

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RICHARD P. ROTHWELL, C.E., M.E., ROSSITER W. RAYMOND, Ph.D., } Editors.

☞ **Articles, communications, reports, documents, books—all things whatsoever belonging to the Editorial Department, should be thus addressed: MANAGING EDITOR ENGINEERING AND MINING JOURNAL, P.O. BOX 1833, New York City.**

**Cable address: "Rothwell," New York.**

Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus *; and only for articles so signed is he responsible.

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IN our last issue, page 199, the ambitious compositor, escaping the control of the proof-reader, made the British government the purchaser of 15,000 tons of Lake copper. Of course, we wrote **1500** tons, and by this more modest figure we prefer to abide.

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THOUGH war is a terrible misfortune in the end to every country, yet for a time it may bring increased business to a neutral nation. We have noticed reports of orders to a Connecticut manufacturer for one hundred and fifty million cartridges; to a Pittsburg rolling-mill for a large quantity of armor plating for the Russian government; to meat canners for over nine million pounds of canned meat for the British government, and to the Ames Company, of Chicopee, Massachusetts, for two hundred thousand swords. It was also rumored recently that our shipbuilding yards had received inquiries, if not orders, for a number of cruisers for the Russian government.

OUR esteemed correspondent "C. U. E." has apparently touched a chord that calls out responsive notes from many quarters. We have and are promised many able communications setting forth the claims of the Civil *vs.* the Military Engineers. The corps of engineers has found an able and skillful defender in "Spectator," and yet, if we may venture a suggestion, we think it would be well for the corps to bring up its reserves within supporting distance, for it looks as if their ally were going to be sorely pressed.

We gladly open our columns to this important discussion, and invite the views of both sides; only, gentlemen, don't waste ammunition at long-range firing, but make every shot tell.

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THE Butte *Inter-Mountain* becomes furious over a paragraph in this JOURNAL that voiced the common reputation of the Anaconda enterprise; and as a proof, the only one cited, that this great company is economically managed, it says: "The very fact of its existence is evidence of the systematic ability with which it is conducted." This is certainly a simple and original way of demonstrating economy in management; but it might be interesting to know how much is in existence and how much it has cost.

It pleases the *Inter-Mountain* to repeat its statement that "the ENGINEERING AND MINING JOURNAL is supported, controlled, and owned" by the Calumet & Hecla Mining Company. It may calm our contemporary's anguished soul to know that neither the Calumet & Hecla nor any of its officers has now or has ever had a single dollar invested in the ownership or control of the ENGINEERING AND MINING JOURNAL. As to supporting this paper, the company has contributed the sum of twelve dollars annually for many years, being the annual subscription for one copy of the JOURNAL for each of its three chief officers.

Though the Calumet & Hecla is extremely liberal, or, according to some authorities, almost as extravagant as the *Inter-Mountain's* Anaconda in its expenditures in many directions, and though its president and officers are liberal scientists and have an enormous interest in profiting by the information that the ENGINEERING AND MINING JOURNAL furnishes; yet, aside from the few subscriptions mentioned, so far as our recollection goes, the company has never expended a dollar in any way to promote the establishment or support of an honest journal of mining and metallurgy. There can be no question whatever of the strict and absolute economy with which the Calumet & Hecla Company has been managed in this respect, at least, and we hope the *Inter-Mountain* will make due apology.

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Under the title of "Modern American Methods of Copper Smelting," we shall very soon begin in the columns of the ENGINEERING AND MINING JOURNAL the publication of a treatise on this most important department of metallurgy from the pen of the distinguished metallurgist, Dr. EDWARD D. PETERS, Jr.

Since the classic text-books of PLATTNER, KERL, and RIVOT, no systematic record of the vast progress made in this art has appeared. This deficiency is peculiarly unfortunate for the American student of metallurgy, as any intimate knowledge of the radical changes that local conditions have rendered necessary is inaccessible, except through the slow and costly school of personal experience.

The object of the work is to furnish the practical and detailed description of the cost and construction of furnaces and other metallurgical apparatus, and full instruction as to their subsequent management according to the most modern and successful practice. Great pains have been taken to furnish exact and reliable figures of cost of each stage in the manufacture of copper in this country. These figures are not estimated according to the ideal method, but are taken from every-day work, extending over a series of months or years, as the case may be, with all the errors, delays, drawbacks, losses, and incidentals, that often go so far toward changing the balance from an apparent profit to an actual loss.

Such a reliable detailed statement of cost is something new in metallurgical literature, and is something that every student, every engineer, and every practical furnace-man will welcome. In a few words, they will in this work find crystallized the long and successful practical experience of one of the most thoroughly trained scientific metallurgists of our day. It is, above all, a work of *practical usefulness.*

The series of articles will run through some thirty numbers of the JOURNAL, and as the demand for them will undoubtedly be great, those who desire to obtain this valuable work or extra copies of the JOURNAL should make early application.

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THE slate mining industry does not appear to be as prosperous as the importance of the product would lead one to expect. The *Slate Trade Journal*, referring to the fact that slate is such an excellent roofing material and the supply unlimited, says that less than one per cent of the houses of this country are covered with it, and notes what it calls the "singular paradox—a manufactured article for which there exists a universal necessity, in point of economy unequaled, and an abundant

supply of raw material, yet the demand for the product is not sufficient to render the industry either remunerative or to stimulate its growth by inducing capital to embark in its prosecution. The coming generation of slate men will solve the problem by revolutionizing the slate industry and establishing and conducting it on business principles." The explanation follows: "There is probably no enterprise of one half the magnitude of the slate business that, during the same period of time, has consumed so small a quantity of printer's ink, and been conducted with such a limited measure of business tact and ability as the past history of the slate industry shows." The time is past when manufacturers of any article can develop or keep up a successful business without the assistance of "printer's ink." Competition in every direction is too close, and the claims of rival products are so energetically advocated that the manufacturer who proposes to make money by ceasing to advertise would do better to go out of business altogether. The greater the competition in trade, or, in other words, the more difficult it is to find a market for his products, the more liberally should the manufacturer invest in well-distributed "printer's ink." Advertise; make known the advantages and claims of your products; and the greater the difficulty in making sales, the greater should be the efforts to secure what business is going. Well-directed advertising is the very basis of business success, and those who neglect it must, like the "slate men," pay the penalty.

## THE PERMANENCY OF WROUGHT-IRON STRUCTURES.

An elaborate report by Professor THURSTON on the present condition of the iron composing the structures of the New York elevated railroads conclusively shows that these structures have not been overstrained; that they are made of good material, as good now as it was the day it was put in place; that they are well-proportioned and of a strength far beyond the danger limit for any one of the possible causes of deterioration; that they are not subject to risk of crystallization or any other source of injury to quality and strength known to engineers. Professor THURSTON'S thorough discussion will perhaps, for a time at least, silence the prating of newspaper engineers about "vibration," "crystallization," "decay," and what not.

We can not forbear to quote a few sentences:

"So far as I am aware, and so far as I can ascertain, there is no evidence extant, and nothing to give the slightest foundation to the belief, that good wrought-iron, loaded within the elastic limit, will ever yield either to stationary or to intermittent unreversed loads, or that crystallization can ever take place under such conditions.

"Thus, that distinguished engineer, the late Mr. John A. Roebling, reporting upon the condition of the great Niagara Suspension-Bridge several years after its construction, states: 'After a thorough examination, I am unable to report any change.' Experiment exhibited the same deflection as when the bridge was first built, and no evidence of loss of strength or stiffness was detected by his repeated measurements of the bridge under load. The same engineer, removing the old aqueduct over the Alleghany River, at Pittsburg, after forty years of continuous service, found the iron suspension-rods to be quite equal in quality to new iron. It was used again in a new structure. Tie-bars that had been in service underground, imbedded in clay for twenty-five years, were found in equally good condition as to quality of the metal. The old St. Clair Street Bridge, near the same locality, after forty years of service, was taken down to make place for the later suspension-bridge at Pittsburg, and its iron was unchanged in quality. Iron originally crystalline remained so; the iron found fibrous at its removal was fibrous when first used; no change in either direction had taken place.

"Testing iron wires from the old Fairmount Suspension-Bridge, taken down a few years since to make room for the new and stronger truss-bridge at Philadelphia, over the Schuykill, and comparing it with good merchant qualities of wire of the same gauge, I found the two lots of wire of substantially the same quality. Thirty years of work had not apparently affected the wire of the bridge in the least."

It is a serious question, and one which time only can completely answer, whether steel structures will prove as uniformly and permanently reliable as wrought-iron has proved to be, or, in other words, whether the fibrous texture of wrought-iron can be equaled in this respect by the granular texture of steel or of ingot iron. In this connection, it is interesting to note that the fibrous texture referred to is imparted to wrought-iron by the presence in it of a small proportion of slag from the puddling-furnace; and that this can be secured in the Bessemer converter also, if desired. The so-called *Kleinbessemerei*, carried on at Avesta, in Sweden, for several years past, produces exclusively soft, fibrous iron by the simple device of pouring slag and iron together into the ingot-mold. This requires, however, a very small charge (usually not more than half a ton), and a direct pouring from the converter, without the intervention of a ladle, which would chill the slag. *

## COAL-DUST IN COLLIERY EXPLOSIONS.

Bergrath ALTHAUS, in a recent session of the Natural History Division of the Silesian Society *für vaterlandische Cultur*, made an interesting report concerning the work of the Prussian Commission for the discovery of safeguards against fire-damp, in the course of which he called special attention to the effect of coal-dust in aggravating the disastrous effects of explosions. Of the fatal accidents in Prussian coal-mines, $\frac{1}{11}$ are due to fire-damp; and the average number of deaths per explosion *where coal-dust is present* is 5, against 1·4 where coal-dust is absent. This statistical argument is conclusive as to the importance of a study of the part played by coal-dust in such cases. The paper of Mr. HUTCHINSON, published in the ENGINEERING AND MINING JOURNAL, January 10th, 1885, sums up the English investigations of this subject, almost to the present time (we believe one or two important papers have appeared since it was written); but it is less full and satisfactory as to what has been done in Europe; and it leaves in doubt the vital questions involved.

Bergrath ALTHAUS, in the report to which we have referred, says of the English investigations, particularly of GALLOWAY and ABEL, that "they did not succeed in completely explaining the influence of coal-dust; and hence opinions on the subject continued to differ." But he remarks, a little farther on, that the expensive experiments conducted since the middle of 1884, at the König mine, at Neunkirchen, near Saarbrücken, have completely solved the problem, have set all doubts at rest. He says: "We can now distinguish dangerous from harmless coal-dust. We know where we must forbid the use of fiery explosions altogether, and substitute other means."

The report of the experiments at the König mine we shall discuss in a later issue. Professor HASSLACHER, of Berlin, who acted as reporter of the Prussian Commission, has made some general statements concerning them, from which it appears that all kinds of coal-dust are capable of exploding violently when ignited by such means as the electric spark, and that the extent of the explosion is much greater with coal-dust than with fire-damp. These conclusions contradict those of the earlier French Commission, which thus appears, on insufficient evidence, to have underrated the danger from this source. The Prussian experiments go to show that dust without the recognizable presence of fire-damp may become, under some conditions, a destructive agent. A thorough study of the experiments themselves will be required, in order to see how far they explain the most impressive fact of all, namely, the fact that so many dusty coal-mines and coal-breakers never have any explosions. No theory which does not somehow account for this fact can be considered complete.

Concerning the quantity of fire-damp generated in Prussian mines, Mr. ALTHAUS observes that 9,000,000 cubic meters escape annually from the shafts of the very fiery Neu-Iserlohn I. mine; and that the seven most dangerous Westphalian mines produce annually 39,000,000 cubic meters. He adds that all the cities of Prussia could be lighted with the gas escaping from Prussian coal mines.

The Pieler alcohol lamp and the Wolf benzine lamp are praised as the most sensitive indicators of the pressure of fire-damp; the former showing so small a proportion in the mine atmosphere as 0·25 per cent, and the latter, 2 per cent. Since explosive mixtures contain more than 6 per cent, the warning thus given would in most cases leave ample time for preventing the danger by increased supply of air, the only radical and effective safeguard. *

## CORRESPONDENCE.

[Communications will be noticed only when accompanied with the full name and address of the writer. Unless specially desired, only initials will be printed. We invite criticism and comment by the readers of the ENGINEERING AND MINING JOURNAL. Replies not intended for publication should be addressed to the Editor of the ENGINEERING AND MINING JOURNAL in blank, stamped, and sealed envelopes. We do not hold ourselves responsible for the opinions of our correspondents.]

### The Product of the Sturtevant Mill.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your last issue, was an article on the subject of the proportion of fines in the discharge of the Sturtevant mill, and the conclusions set forth offer a fair field for discussion.

Mr. Heard, in his article, states that his examination of the Sturtevant mill and its product had special reference to a comparison of its pulp with that produced by stamps and rolls; and as a result of certain sizing experiments on the pulp from a certain material crushed, he concludes that the mill is of no practical use to prepare ore for any process in which stamps and rolls are at present used. This conclusion is not quite so broadly stated in the article referred to; but in effect, the exceptions quoted to the possible use of the mill cover practically the whole field of ore-reduction outside of smelting. Mr. Heard gives certain figures showing the proportional quantities of various sizes of particles in the pulp from the Sturtevant mill, and these figures are susceptible of a different interpretation from that based on them in the article; in fact, so far as they go, they may fairly be taken to prove the exact reverse of Mr. Heard's conclusions. Taken alone, the figures prove nothing, as no figures are given of pulp from stamps or rolls to afford a comparison. This omission I wish to supply. It is generally known, or believed, that dry stamps make a good deal of "fines" or dust, and rolls less; but this is a mere general opinion, and of no value as a means of comparison with actual figures on the product of any other system of crushing. In regard to rolls, even this general opinion is rendered still less reliable as a basis of calculation when the crushing is carried to a uniform fineness sufficient to pass a screen of 30 or 40-mesh, instead of the more common coarse crushing done by rolls.

First, as to stamps. Practically, all the ores roasted for amalgamation or leaching, all free-milling silver and gold ores, and gold ores requiring concentration, have hitherto been crushed by stamps; and it is therefore a fair supposition that any system of crushing that does not make more "fines" than stamps, could, other things being equal, be used as a preparation of such ores. Mr. Heard begins his sizing of the pulp from the Sturtevant mill at 10-mesh; but as this is too coarse a material for any of the above-mentioned processes of ore-reduction, I prefer to begin at 30-mesh for purposes of comparison with pulps as ordinarily used. If we deduct the material coarser than 30-mesh from the table of sizes quoted, the product that passes a screen of 30-mesh will contain 35·8 per cent fine

enough to pass a screen of 140-mesh. Taking the pulp of the second experiment in the same way, it will be seen that 38·1 per cent was fine enough to pass a screen of 140-mesh. It may be mentioned here that the dust drawn off into dust-chambers during the running of the mill was, I am informed by a gentleman who assisted in Mr. Heard's experiment, estimated by difference, and therefore includes the moisture in the ore, which is pretty thoroughly dried during the crushing and delivery. A mean of these two experiments gives 36·8 per cent of what we may call for convenience "dust." It is not necessary to go into details of the various percentages of sizes between 30 and 140-mesh, as the question at present is one simply of "dust;" but on another occasion, I shall be glad to present comparative tables showing all sizes from experiments on different ores, and the pulps of stamps and rolls.

Three average samples of pulp, from three different dry-crushing stamp-mills, working different ores, show respectively 60, 67, and 76 per cent of "dust" finer than 150-mesh. These mills are modern typical silver mills, well managed and working successfully; the furnaces used being the Stetefeldt in one case, the Howell-White furnace in the other two. The only objection that can be urged to such a comparison would be the supposed fact that the Sturtevant mill running at a high speed must naturally produce a dust of much dustier dustiness than a stamp-mill. Mr. Heard, however, appeals simply to figures, and the only legitimate conclusion from the above is, that the Sturtevant mill is vastly superior to dry stamps as far as the production of objectionable "fines" is concerned. It is only fair to say that the percentage of "dust" produced by the Sturtevant mill varies on different ores, and is considerably affected by speed of mill and size of screen discharge in the same, as I have determined by experiments on the same ore in two mills of different sizes.

On wet-stamp pulp, using a 40-mesh screen, I will quote at present simply one sample showing 58 per cent finer than 150-mesh. However, with wet stamps the degree of fineness of crushing is usually limited by the matter of cost or difficulty in settling, rather than by fear of making ore too fine for subsequent treatment, except in some cases of simple concentration.

That rolls do not produce "dust," as above defined, in any such quantity as Mr. Heard assumes is fatal in the case of the Sturtevant mill, is a mistake. I have figures on an ore crushed both in the Sturtevant mill and by crusher and rolls. I will not quote the figures on the Sturtevant mill, as the test was a small one, and the dust-chamber product not estimated; but the product of the rolls, after passing 30-mesh screen, showed over 50 per cent finer than 150-mesh. The ore was was a hard silver ore containing galena and zincblende.

In the case of a very base ore lately crushed in the Sturtevant mill, it was noticed as an unexpected result that the galena and zincblende were not broken into slime, but seemed to crush and discharge at the first impact and before being subjected to any great attrition. Mr. Heard states that the action of the mill is chiefly a grinding one; but the work done on large rock pieces and masses of copper matte show plainly that the impact due to arrested centrifugal motion must play a very important part in the work; and no mere theory of grinding will account for the crushing of cast-iron balls, and the production of all sizes of angular fragments from the same by the mill.

In regard to the production of a homogeneous pulp, which Mr. Heard states the Sturtevant mill is not adapted to turn out, this need not be questioned; but as no other system of crushing yet used is capable of producing such a thing, the Stutevant mill will not be limited in its usefullness by this failure common to its competitors. D.

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### The Ore Percentage at the Atlantic and that at the Osceola.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your paper of the 21st inst., you say you would like to know the reason why a 0·75 per cent ore pays at the Atlantic, and a 1·78 per cent ore at the Franklin barely covers expenses, and a 1·80 per cent ore at the Huron runs behind expenses.

Possibly I can show the reason for this. Take the Osceola mine, for instance. Its percentage of mineral in rock stamped was 1·23. Its total expenses, excluding construction, were $477,388.99, and tons of rock stamped 181,608, or a cost of $2.63 per ton of rock stamped. The Atlantic cost per ton of rock stamped was $1.64. On the face of it, it looks as if one mine was much more economically managed than the other, but such is not the case.

One must know the characteristics of the different lodes worked to be able to form a comparison. That of the Atlantic is the easiest lode to work in the Lake Superior country, and last year it produced 209,510 tons of stamp-rock. It sunk in all but 83 feet, and drove but 2954·5 feet. The Osceola sunk on its lode 934 feet of shafts and 497·6 feet of winzes and rises; it drifted regularly 5028·7 feet, and short drifts for pillars and cross-cuts 169·7 feet, or a total opening work of 6630 feet, against 3037·5 feet for the Alantic. Yet the Osceola broke but 12,134 fathoms of ground, and the Atlantic broke 12,213 fathoms. From its extensive openings, the Osceola got but 181,608 tons of stamp-rock; and the Atlantic, from less than half that amount of opening work, obtained 209,510 tons of stamp-rock. This shows that the Atlantic lode produces much more stamp-rock from stopes than the Osceola produces; or, in fact, that pretty much all of the Atlantic lode is stamp-rock, and that its work can almost be called quarrying, in place of mining.

In addition, it may be said that the Osceola was subjected to a charge of 23·74 cents a ton for transporting its rock to its stamp-mill over the Mineral Range Railroad, while the Atlantic, over its own road of a few miles, has done this work at a cost of 4·4 cents.

These same comparisons could be made between the Franklin or Huron and the Atlantic; but I think what I have given will suffice to answer your query. Yours very truly, A. S. BIGELOW,

BOSTON, March 23. Treasurer.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In reviewing the reports of the Huron and Franklin copper mining companies, you draw comparisons between the work done at those mines and at the Atlantic, and call for reasons why a 0·75 per cent ore pays at the latter and a 1·78 per cent ore scarcely covers expenses at the Franklin, and an ore of 1·80 runs far behind expenses at the Huron. The data that you print in your last issue, one below the other, concerning the Atlantic and Huron mines, by themselves go far toward explaining the apparent discrepancy. The Atlantic did 83 feet of sinking, the Huron 398·8 feet; the former, 2954·5 feet of drifting, at an average of $8.20 per mining foot, while the Huron, with a product one third less, did nearly as much drifting and cross-cutting, or 2421·9 feet, at an average price of $12.56, or more than 50 per cent higher, and stoping compares similarly as $8.74 to $12.72. That is to say, the Huron has opened more ground per unit of stoping, it costs 50 per cent more to do it, and stoping itself is nearly 50 per cent dearer. The Huron vein is "pockety." The rock also is harder, which affects the cost of stamping, which, as you will note, amounts to 38·95 cents per ton in the case of the Atlantic, and 70·85 cents, or nearly double, in the case of the Huron.

You have been misled, in referring to the percentage of the Huron rock, that the figure stated, 1·8 per cent, was the yield of "*mineral*," which yields only 80·78 per cent of "*ingot*" copper. The average of the Huron rock stamped is therefore 1·453 per cent, a figure reached by computing the yield from the quantity of rock stamped and the yield of marketable ingot copper.

It is not an easy matter to draw comparisons between the different Lake Superior mines; but as illustrating the difference between the Atlantic, an amygdaloid mine, and the Osceola, working a conglomerate vein as economically as any on Lake Superior, I may state that the total expenditure per ton of rock treated in the case of the former is $1.7099 and for the latter $2.2056, both in 1884. The Franklin reports $2.22 per ton of rock for delivery of mineral at smelting-works. Adding about 33 cents for freight, smelting, and selling expenses, we reach a total of $2.55. It is expected that there will be a saving on this of more than 22 cents this year.

As a further evidence of the danger of drawing conclusions on the basis of yield of rock alone, I may point to the fact that the report of the Allouez Mining Company, which is under the same management as the Atlantic, shows that in 1883, with rock yielding 0·85 per cent of copper, the cost was 15·98 cents, that in the first nine months of 1884, running with two Ball heads, the cost on 0·799 per cent rock was 15·54 cents, and in the last three months, working with rock yielding 0·824 per cent, it was 12·43 cents, although stoping cost only $6.02 per fathom, and drifting $8.54 per running foot.

Looking over the published figures and taking into consideration the wide differences in the individuality of every mine, it seems dangerous to draw unfavorable comparisons based on differences in the yield of rock alone. M. M.

NEW YORK, March 22.

[We gladly put on record the above partial answers to our inquiry for reasons for the cost of production being so much greater at the Huron and the Franklin than at the Atlantic mine. The work at any of these mines would be considered very remarkable by itself. The explanations given assume in some cases the form of truisms that no one would question, and in other figures simply assert that the reason the whole cost is greater in one case than in the other is because the corresponding items are greater in one than in the other, which can scarcely be considered an answer to our inquiry. We have no doubt the companies referred to have harder rock, and, in some items, necessarily greater expenditures. Whether these greater expenditures are all due to natural and insurmountable causes, is the question. In any event, the work of each alone would be considered very good.—EDITOR E. AND M. J.

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### Civil vs. Military Engineers.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: "Spectator" proposes to inflict on us a professional history of the military engineers now in charge of public works. If he carries out his threat, I would beg of him to add at the same time, in order to make matters complete, a professional history of the civil assistant engineers who may have been connected with the engineer officers to be mentioned, on the works on which the former have gained their professional reputation.

But, Mr. Editor, I assure you there is no need of taking up so much of your valuable space for such a purpose. Granting that the engineer officers are the very acme of engineering perfection, granting that their power of acquiring knowledge is so great that they can be readily transferred from one kind of work on which they have had experience to take charge of another on which they have had none—granting all this, I say, the question still remains: Why should the prospect of promotion be held out to them and to them alone? As matters now stand, there are two distinct classes of government engineers. That the lines are strictly drawn. that the civil engineer is often made to feel that in the mind of the engineer officer he occupies an inferior position, dare you deny it, Mr. "Spectator"? If you dare, you do not speak from experience, and the testimony of many assistant engineers will bear witness to that effect. The number of military engineers engaged on river and harbor work exclusively is about 40; the number of civil assistant engineers about 225, counting as such merely those who figure in the civil register of 1883–84 as assistant engineers, and not counting as such the hundred and more who are entered under the headings of surveyors, rod-men, and draftsmen. To my certain knowledge, many of these latter are also graduates of our best engineering schools. These men are largely the very ones from whom the assistant engineers are recruited, because they have gained on the work the experience that is essential for the success of the same. The men in charge of such work "are captains or officers of a higher grade," says "Spectator." True. But where are the young lieutenants of engineers? Are they undergoing a similar schooling to that of the young engineer graduates mentioned above? Are they surveying lines, drawing maps, and in fact doing the "obscure," "difficult," and "disagreeable" jobs that the civilian assistant has to do? Are they doing surveying and construction work on our rivers and harbors, in the subordinate positions befitting their knowledge at the time of graduation? If so, I have still to learn the fact, and I have had a few years of personal experience in the matter. Under the heading of Engineer Department at Large, I find in the civil register for 1883–84 about 40 officers as stated above, detailed for river and harbor work. With two or three exceptions, none of them

has young military engineers detailed for duty under him. Those so detailed are either in Washington or New York, and hold positions that Mr. "Spectator" must well know, if he is as well posted as he claims to be, are superior to any held by civilian assistants, and are certainly so considered by the incumbents. The point that I desire to bring to Mr. "Spectator's" attention is this: Where are these lieutenants gaining the practical experience in river and harbor work that is fitting them to take charge of these works, on which they are not now employed, but the exclusive control of which will fall to them when, thanks to the flight of time, they have reached that rank in the corps that, according to "Spectator," they must have obtained in order to be placed in charge? What justice is there in passing these men over the heads of civilian assistants who, to a thorough theoretical training, have added years of experience on the work on which they are engaged?

As a former assistant engineer, I can not lay claim to the disinterestedness professed by "Spectator." But lest my motives be impugned by him, I wish to make a personal statement. I left the United States engineering service of my own free will, do not desire to return, and my relations with the engineer officer in charge, for whose abilities I have great respect, were extremely pleasant. I have, however, a most decided interest in the welfare of my former colleagues, and it is that which prompts me to write these lines, and will cause me to exert all the means in my power toward a change in the existing state of things. I claim to have had somewhat better opportunities for judging of the working of a system that "Spectator" extols. I have had conversations on the subject with many of my former colleagues, and therefore do not hesitate to give the answers to the following of "Spectator's" questions: "How many would be willing to undergo the eighteen years of preparation?" All, Mr. "Spectator." "How many of the civil assistants would be willing to dedicate their life to the government service?" All, Mr. "Spectator," all, if you will also hold out to *them* the hope of steady employment, even at a low salary; of promotion for merit and for duty well performed. Plant this hope in the breasts of these men, and see what the result will be. I do not hesitate to say that the majority of assistant engineers now in the employ of the government engineering service, as at present organized, are anxious to leave that service, could they but find something else to do. But, as we shall see farther on, the very fact of their working for the government, and on a kind of work over which the government has exclusive control, unfits them for other work in the profession. In every other branch of engineering, a gain in practical experience means a gain in engineering capital, places the engineer higher in his profession, increases the demand for his services, and carries him upward on the ladder of success. In government engineering work, this is not the case, at least as far as the civilian assistant is concerned. The longer the latter stays in the service, the worse for him, because he is working himself into a specialty, acquiring a species of practical experience that unfits him for competition with his brother graduates who have chosen other branches of the profession. By this, I mean those branches in which there are a number of bidders for their services, and *no bars* to their professional advancement.

On river and harbor work, the civilian is shut off from competition with the military graduate by a generous republican government, which clears the track for the military racers, who, at least in some cases on record, pass as winners under the wire handled by civilian drivers.

The whole question opened up by the papers of "C. U. E." and "Spectator" is one of vital importance to the members of our profession. May it receive a thorough airing from both sides! The civilian assistant will probably have reason to feel satisfied with the results.

C. D. M.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The fear which you humorously expressed, week before last, lest your columns should be overwhelmed with extracts from the *Army Register*, was not without reason. If I should undertake to give in full the engineering experience of the officers now in charge of public works, you might well decline to publish what would occupy your columns for weeks, to the exclusion of every thing else. But I shall not run the risk of such a refusal. I purpose in the present communication to give at some length, as an example, the record of a single officer, after which, what I wish to say concerning other officers of the corps can be greatly abbreviated—almost to the point of a mere tabulation. I take as my example the present Chief of Engineers, Brig.-Gen. John Newton, whose career may serve as a type for other officers who graduated from West Point before the war. It may not, perhaps, so closely represent the *post-bellum* graduates, who are more strictly the products of the present system of instruction and training.

But it should here be observed that the question, after all, is not whether the present system can be improved, but whether it should be abolished. If improvements are possible, would any body else be more likely to adopt them than the officers whom the operation of the system has brought to the top? From this point of view, it is specially important to know what sort of engineer presides over the corps, and what has been the nature and extent of his practical experience. I will add here that the facts I give are taken from official records. I have not presumed upon my slight acquaintance with General Newton, whom I met as a civil engineer many years ago, to consult him on this subject: and I have no doubt that he will find my account incomplete, if he takes the trouble to glance at it. Indeed, I presume I could add much to it by more laborious investigation of public documents. But it will do well enough as it stands.

General Newton's present official duties are the following: (1) He is in command of the Corps of Engineers and in charge of the Engineer Department; (2) he supervises such matters connected with the works at South Pass, Mississippi River, as require the action of the Secretary of War; (3) he is in charge of East River and Hell Gate improvements; (4) he is in consultation with the authorities of the State of New York in locating extensive pier and bulkhead lines on the Hudson River; (5) he is a member of the joint board to report on an interior coast-line of water-ways; (6) he is a member of the Light-House Board. The Washington Monument Commission, of which he is also a member, has, I suppose, little to do now; but engineers need not be told that it has had to deal with important problems of peculiar difficulty.

Certainly there is variety enough in the foregoing list to expose incompetency, if it exists, or to employ fully the skill and judgment wrought by wide experience. Let us see what has been the previous training of this officer.

General Newton graduated second in his class at West Point in 1842, and entered the Corps of Engineers as a second lieutenant. His subsequent career may be stated in condensed form and chronological order as follows:

1842–43. Assistant to the Board of Engineers.
1843–46. Assistant Professor of Engineering at West Point.
1846–49. Assistant engineer in construction of forts.
1849–52. Engineer in construction of forts.
1852. Examined and promoted to first lieutenancy.
1852–53. Employed in surveys of Cobscook Bay, Kennebec River, and Matinicus Island, for breakwater at Owl's Head, Me.
1853–54. In charge of improvement of St. John's River, Fla., of Haul-over Canal, and of the repairs of the St. Augustine sea-wall, Fla.
1854. In charge of improvements of light-houses on Savannah River, the trial and inspection of a dredge-boat for Sullivan's Island bar, and the construction and maintenance of forts.
1855–58. In charge of light-houses and forts at Pensacola.
1856. Examined and promoted to captaincy.
1857–58. Member of the Board on Coast Defense and Chief Engineer of the Utah Expedition.
1858–61. Engineer in construction of forts.
1861–66. On military duty during the rebellion.
1861. Promoted to be Major of Engineers.
1865. Promoted to be Lieutenant-Colonel.
1866–78. In charge of the improvement of the Hudson River, the removal of obstructions in East River and Hell Gate; the removal of the wreck of the steamer Scotland; the manufacture and supply of mastic; the improvement of Burlington harbor, Vt.; Plattsburg harbor, N. Y.; Port Chester harbor, N. Y.; East Chester Creek, N. Y.; Rondout harbor, N. Y.; Passaic River, N. J.; Otter Creek, Vt.; surveys of Keyport harbor, N. J.; channel between Staten Island and New Jersey; Rouse's Point harbor, N. Y.; Swanton harbor, Vt. (also its improvement); Lower Harlem River, N. Y.; Raritan River, N. J. (and its improvement); Upper Harlem River, N. Y.; transportation route from Troy to New York; Echo and New Rochelle harbors, N. Y. (and their improvement); various bays and inlets on Long Island, and breakwaters at Rouse's Point and Port Henry, N. Y. During the same period, member of the following boards: testing gun-carriage; examining officers for promotion; improving Hudson River; improving Buffalo harbor; for Block Island breakwater; improving Erie harbor; removing wreck of steamer Scotland; improving Ogdensburg harbor; East River Bridge; improvement of Wallabout Channel; improvement of Appomattox River; gun-platform; Lewes's screw-pile pier, Del.; Delaware breakwater; harbors of St. Louis and Alton, and banks of Mississippi River; exterior line of piers and bulkheads, Brooklyn; fixing value of land at Plattsburg, N. Y.; Horseshoe Shoals, Delaware River; Mississippi River Ship-Canal; Galveston harbor; Channel between Staten Island and New Jersey; Savannah harbor and river; Stonington harbor, Conn.; line of piers, etc., Staten Island; line of piers, etc., Hudson River; entrance to Charleston harbor.
1879. Promoted to be colonel.
1878–84. In charge of the following works and surveys, in addition to many of the works above mentioned: South River, Cheesequake Creek and ship-canal across Bergen Neck, N. J.; member of board on improvement of Pass Cavallo Inlet and Aransas Pass, Tex.; member of the permanent Board of Engineers; member of boards to determine New York harbor-lines, Hudson River pier-lines, and improvement of Charleston harbor; in charge of deepening the channel of Gowanus Bay and New York harbor; surveys at New Rochelle, Bronx River, Hempstead harbor, Sumpawaum Inlet, water-way from Jamaica Bay to Cornell's Landing, Patchogue River, and Harlem River; in charge of improvements at Ticonderoga River, Flushing Bay, Sheepshead and Canarsie Bays, East Chester and Newtown creeks, Buttermilk Channel, Sumpawaum Inlet, Shrewsbury, Rahway, Elizabeth, Manasquan, Passaic, South, and Raritan rivers, Raritan Bay, Woodbridge, Cheesequake and Matteawan Creeks, N. J.; of surveys at Harlem River and Kilns, Port Henry, and North Hero Channel, Lake Champlain, outer and inner bay of New York; of removal of bark Samarang, near Sandy Hook, and of the following examinations: Brooklyn Bridge, Gowanus and Minisceongo creeks, Saugerties and Peekskill harbors; in charge of the removal of a wreck near Sing Sing; member of the board to locate a bridge over the Thames River, Conn.
1884. Promoted to be brigadier-general and Chief of Engineers.

In addition to these official duties, General Newton has been much engaged in outside professional work; for example, in the improvement of the harbor at Montreal, Canada; consultation-work in connection with the Victoria Bridge, etc.

The foregoing imperfect record may be condensed into the following *résumé*:

| | |
|---|---|
| Service as assistant engineer | 10 years. |
| Service in the field | 5 years. |
| Service in charge of works | 27 years. |
| Number of works of civil engineering with which he was connected (as shown above) | about 80 |
| Number of constructive military works | " 8 |
| Number of boards on civil works | " 30 |

Upon this statement, a few comments may be appropriate. It will be seen that the period of Gen. Newton's service covers the war, in which he distinguished himself as a commander. While that part of his war service which consisted in the command of troops may not have been directly engineering experience, I presume no one will assert that it was directly detrimental to engineering capacity. As to the "military" work of engineers, in war or peace, I confess that I do not quite comprehend the distinction which is sought to be made between such work and civil engineering. A quick eye for topography and the ability to make surveys and maps, to build either solid and permanent or temporary structures, bridge rivers, to make excavations and embankments, and to act promptly in emergencies, are requirements of civil engineering, and military engineering is mainly civil engineering.

If a man possesses these requirements, I do not see that he is any less competent for having got them or being able to practice them, under fire. Gentlemen who talk glibly about "Civil *vs.* Military Engineering" seem to think that military engineers are occupied with the manual of arms, and with ordnance and gunnery, and with the peculiar conditions of war. That this is not the case, the record of the occupations of our military engineers clearly shows. Even the foregoing record of General Newton shows it; but the case would be made still stronger by a similar record of some younger officer. It would then be seen that since the war, the Corps of Engineers exhibits a slower promotion, a longer probation and preliminary training, and a special post-graduate course at the Willets Point school, as the pre-requisite to the independent charge of works.

Those who remember the earlier industry of the attempts to remove obstructions in the East River and Hell Gate can not easily be made to regret that this great work was at last taken out of the hands of civilians, and put into the hands of the army engineers. That history alone contains nearly the whole argument of the question now at issue. But I do not purpose, at this point, to interrupt my presentation of facts by a premature drawing of general conclusions. I mention this point in passing, only because it is suggested to me by the record I have quoted, and because the associates of General Newton in the American Society of Civil Engineers can not refuse to bear witness to the ability with which he conducted the Hell Gate works; the anxious fidelity with which he watched every detail; the zeal with which he sought, and the readiness with which he received, suggestions from all qualified professional colleagues, military or civilian; and the entire absence of quackery in his methods and proceedings.

I think the civil engineers who now (as many undoubtedly do, or think they do) regard our public works as something to be taken from the charge of the army engineers would unite in saying that such works should be under *some* head, and *some* system, independent of the Washington lobby; and that *some such man* as General Newton should be the permanent chief of the proposed organization. In other words, the present system has produced a model chief. Very well; let us "stick a pin there."

SPECTATOR.

## OFFICIAL STATEMENTS AND REPORTS.

### Granite Mountain Mining Company, Montana Territory.

The work of this company for the year ended October 31st, 1884, was mostly in mining and mill construction. The superintendent, Mr. F. L. Perkins, reports the mine in excellent condition, with large bodies of ore ready to take out. The new 20-stamp Fraser & Chalmers dry crushing chloridizing mill was finished at a cost of about $90,000, and put to work at the end of November, 1884, and has since given great satisfaction. A supplemental report of the company issued March 3d, 1885, gives a very satisfactory statement of the present condition of this company. The company was organized September 3d, 1881. From that date to January 1st, 1885:

| | |
|---|---|
| The receipts from loans, interest, etc., were | $49,543.17 |
| Stock at $1 a share | 39,246.59 |
| From bullion | 273,897.81 |
| Total receipts | $462,687.57 |

The following is the trial balance-sheet January 1st, 1885:

| | Dr. | Cr. |
|---|---|---|
| Capital stock account | | $10,000,000.00 |
| Labor and salary account (due in Montana) | | 9,477.84 |
| Accounts payable to merchants and others in Montana | | 3,975.22 |
| Accounts payable to merchants in St. Louis | | 1,233.37 |
| Bills payable account: | | |
| Our acceptance favor Fraser & Chalmers, due January 5th, 1885 | $3,075.84 | |
| Our note discounted at bank, due February 19th, 1885 | 20,000.00 | |
| Our note discounted at bank, due March 22d, 1885 | 60,000.00 | 83,075.84 |
| Cash overdrawn at bank in Montana | | 282.03 |
| Mining account (value of ore milled in December, 1884, less cost of milling), (see debit) | | 61,629.55 |
| Profit and loss account (consists of "profit" on sale of stock in 1881 and balance of "profit" on ore milled in 1883) | | 146,514.62 |
| Real estate account (original purchase of property) | $10,000,000.00 | |
| Supply accounts (includes fuel and chopping) | 46,360.57 | |
| Mill construction account | 90,738.87 | |
| Buildings account (includes office, dwellings, warehouses, etc) | 20,753.17 | |
| Power room account (air-compressor and power drill machinery and buildings) | 12,629.97 | |
| Live and rolling stock account | 1,532.00 | |
| Lodes accounts (purchased and improvements and developments to date) | 27,275.95 | |
| Mining (and development accounts) levels, stopes, etc., since November 1st, 1884, as charged to various accounts—(see credit as above) | 12,899.11 | |
| Milling account (entitled to credit for unconsumed supplies at end of month and for amalgam and retort not converted into bullion bars) | 19,491.95 | |
| Bullion account (shipped during December and not sold before end of month) | 53,874.54 | |
| Cash in bank in St Louis | 3,546.21 | |
| Tramway and water right and water-works accounts | 2,069.65 | |
| Miscellaneous road accounts | 5,211.49 | |
| Miscellaneous expense accounts, home department (includes interest and insurance) | 3,537.36 | |
| Miscellaneous expense accounts, Montana department | 2,369.57 | |
| Patents and surveys and surveyor's accounts (to be charged to lodes accounts) | 2,928.06 | |
| Accounts receivable in Montana | 970.00 | |
| | $10,306,188.47 | $10,306,188.47 |

The secretary of the company, Mr. J. T. Field, writes us that, at the end of February, the new mill had run 81 days and had produced over $200,000 cash from 1697 tons of dry ore. Net value of shipments in January, 1885, $62,900; February, $76,700; March, $39,575 up to the 14th.

This company appears to be entering upon a profitable course, and as it is evidently managed by reputable business men and with good management at the mines, the stockholders will no doubt receive their full proportion of the profits.

### Hope Mining Company, Montana.

The superintendent's report of this company last year stated that the ore-bodies had been practically exhausted. Since then, exploration-work has discovered further ore-bodies, and the assistant superintendent, Mr. George H. Babcock, reports ore enough to supply the mill with from 25 to 30 tons a day for six or eight months. The diamond drill has been used successfully in searching for ore-bodies. A total of 5313 feet of holes were bored, at an average cost per foot of $1.11½, and an average bored per hour of 6·36 feet. During the fiscal year ended September 30th, 1884, 2822 tons of ore were mined, at an average cost of $12.91 per ton; 3136 tons, including custom ores, were milled and amalgamated, at an average cost of $6.35 per ton; average amount recovered, 16¾ ounces per ton of ore amalgamated; 2573 feet of levels, drifts, shafts, etc., were run, at an average cost of $15.69 per linear foot, and about 25 cents per cubic foot. The cost per ton of ore and waste removed is stated to have been about $3. Batteries in service 156 days; average ore crushed per stamp in twenty-four hours, 2·24 tons; average capacity of pans per charge, 2·267 tons. Hope ores crushed, 2840 dry tons; average assay value, 21·33 ounces per ton; estimated per cent of reduction, ·75. Custom ores milled, 296 dry tons; assay value, 30·57 ounces per ton. The report shows, on the whole, not quite as good work and poorer ore than in the previous year.

CASH ACCOUNT—HOME DEPARTMENT.

| | | |
|---|---|---|
| To November 1st, 1884, as follows: | | |
| Balance of cash in bank in St. Louis, November 1st, 1883 (No bullion then *en route*.) | | $82,234.62 |
| *Receipts.* | | |
| Proceeds 53 bars bullion, Nos. 871 to 923 inclusive | $58,435.75 | |
| Proceeds of old safe sold in St. Louis | 25.00 | |
| Proceeds of wood sold, received in St. Louis | 177.00 | |
| Interest received on sinking fund | 1,222.98 | 59,860.73 |
| | | $142,095.35 |
| *Disbursements.* | | |
| Superintendent's drafts for current expenses | $84,200.00 | |
| Exchange on above | 168.40 | |
| Express charges on 58 bars bullion, Nos. 871 to 928 inclusive | 972.98 | |
| Supplies and machinery purchased and freights prepaid | 6,893.53 | |
| Insurance | 722.25 | |
| Home Department—salaries, rent, taxes, and miscellaneous | 5,228.58 | |
| Four dividends | 45,216.00 | 143,401.74 |
| Balance overdrawn at bank in St. Louis, November 1st, 1884, *by the books* | | $1,306.39 |
| Estimated value of 5 bars bullion, Nos. 924 to 928 exclusive, in New York | $5,280.00 | |
| Estimated value of 5 bars bullion, Nos. 929 to 933, shipped from Philipsburg, November 7th | 6,300.00 | |

In our opinion, the company has acted unwisely in paying out all its surplus in dividends. With the present outlook and past history of these mines, it would be prudent to carry a substantial reserve fund and resist the temptation, very great in these hard times, to pay out in dividends all the money in the treasury. Otherwise, the company appears to be well managed and worthy of credit. The secretary has informed us that the Hope Company has shipped since January 1st of the present year $23,500 of bullion, and another shipment is expected next week.

### Allouez Mining Company, Lake Superior.

We are indebted to Mr. A. D. Hodges, Jr., for the following elaborate analysis of the Allouez report:

The following is the treasurer's report:

| | | |
|---|---|---|
| Cash received for 1,932.170 pounds copper at 13·02 cents (average) | | $251,672.73 |
| Assessment payable January 3d, 1883 (*sic*) | | 40,000.00 |
| Surplus brought forward from 1883 | | 71,769.39 |
| | | $363,442.12 |
| Net working expenses at mine | $239,804.23 | |
| Smelting mineral and marketing ingot | 40,403.20 | |
| Construction | 41,236.79 | 321,444.22 |
| Net surplus December 1st, 1884 | | $41,997.90 |
| Excess of total expenditure over production | | $69,771.49 |
| Average yield per ton of rock stamped, about | | 17 pounds copper |
| Average value per ton (present prices), about | | $1.87 |

The item of construction is made up principally of the cost of additions to the mill, increasing its capacity one third and enabling it to treat about 150,000 tons annually. The improvements have reduced the expenses per pound of refined copper, according to the statements given, twenty per cent, namely, from 15·54 cents during the first nine months of the year, while working 2 heads of stamps, to 12·43 cents during the last three months, while working 3 heads. Could the directors have foreseen the disastrous decline in the market value of copper, they would not have ventured to incur so large an expenditure for construction, which, however, seemed wise at the time and would have insured the success of the enterprise had copper remained over 13 cents a pound. Some reductions in the prices of labor and materials to be made during the present year may still further reduce the cost—to 12 cents, or possibly 11½ cents per pound marketed and all expenses paid. But with the present outlook, the directors believe that it is for the best interest of stockholders that operations at the mine should be suspended at an early date.

AGENT'S REPORT.

The operations at the mine were as follows:

| | |
|---|---|
| Sinking shaft | 109·0 feet. |
| Driving levels | 1790·7 " |
| Driving for pillars | 11·0 " |
| Stoping | 8129·5 fathoms. |
| Ground broken in openings | 758·7 " |
| Ore mined (principally from 5th to 15th levels) | 141,549 tons. |
| Ore hoisted | 137,928 " |
| Ore stamped | 119,630 " |
| Yield of mineral | 2,775,295 pounds. |
| Yield of refined copper (69·62 per cent) | 1,932,170 " |
| Cost per pound of refined copper as mineral, less construction | 11·4 cts. |
| " " " " smelted, " " | 12·7 " |
| " " " " marketed, " " | 13·5 " |

The ground south of No. 2 shaft from the tenth level, which has attained a length of 746 feet from the shaft, to the fifteenth, which is in 295·2 feet, has been uniformly productive and gives encouraging pros-

pects. The ground south of No. 1 shaft has been fairly productive so far as opened; and here there is a long stretch of virgin ground up to the boundary line. The ground opened up at the lower levels of No. 3 shaft has not been productive.

There have been added to the mill a new head of Ball's stamps with a suitable building, 21 iron-frame dressing-machines, 2 slime-tables, a boiler, smoke-stack, and steam-pipe. A ditch has been excavated, and a launder laid therein, from the Gratiot River to the mill.

EXPENDITURES.

The statement of expenditures at the mine is a creditable effort in the way of itemizing the expenses—a thing very essential for economical management. We suggest that the heading of "surface expenses" be done away with, and the items thereunder re-classified. For instance, general superintendence, applying to all the different operations, should be separated from wages of those engaged in special duties.

The assayer does not seem to be a highly prized person, only $302 having been spent on assaying during the year.

The summary of results for the years 1882, 1883, and 1884 shows a steady decrease in the cost of treatment; over 16 per cent in all.

STATEMENT OF EXPENSES.

| | | | Per ton. | Per lb. ingot, cents. | | Per cent. | |
|---|---|---|---|---|---|---|---|
| *Mining:* | | | | | | | |
| Underground expenses (141,549 tons ore).* | | | | | | | |
| Contracts, net† | $52,713.25 | | $0.37 | 2·31 | | 16·4 | |
| Labor, company account‡ | 34,493.69 | | 0.24 | 1·51 | | 10·7 | |
| Supplies, company account | 9,274.31 | | 0.07 | 0·40 | | 2·9 | |
| Running cost of compressor and power drills | 14,931.11 | | 0.11 | 0·65 | | 4·6 | |
| | $111,412.36 | | 0.79 | 4·87 | | 34·6 | |
| Hoisting (137,928 tons ore). | | | | | | | |
| Labor | $6,931.31 | | 0.05 | 0·31 | | 2·2 | |
| Fuel | 11,534.24 | | 0.08 | 0·52 | | 3·6 | |
| General supplies | 4,852.11 | | 0.04 | 0·22 | | 1·5 | |
| | $23,317.66 | $134,730.02 | 0.17 | $0.96 | 1·05 | 5·92 | 7·3 41·9 |
| *Milling:* | | | | | | | |
| Selecting and breaking (119,630 tons ore; 1,932,170 pounds ingot). | | | | | | | |
| Labor | $14,968.16 | | 0.13 | 0·77 | | 4·7 | |
| Fuel | 5,361.50 | | 0.04 | 0·28 | | 1·7 | |
| General supplies (including teaming) | 3,671.76 | | 0.03 | 0·19 | | 1·1 | |
| | $24,001.42 | | 0.20 | 1·24 | | 7·5 | |
| Stamping and washing (119,630 tons ore; 1,932,170 pounds ingot). | | | | | | | |
| Superintendence and labor§ | $20,191.31 | | 0.17 | 1·05 | | 6·3 | |
| Fuel (9521 cords wood at $3 35) | 30,944.33 | | 0.26 | 1·60 | | 9·6 | |
| General supplies | 9,610.18 | | 0.08 | 0·50 | | 3·0 | |
| | $60,745.82 | $84,747.24 | 0.51 | $0.71 | 3·15 | 4·39 | 18·9 26·4 |
| *Smelting:* (119,630 tons ore; 1,932,170 pounds ingot). | | | | | | | |
| Smelting 2,775,295 pounds mineral at $18.05 per ton | | $25,058.39 | | $0.21 | | 1·30 | 7·8 |
| *General:* (119,630 tons ore; 1,932,170 pounds ingot). | | | | | | | |
| Construction | 41,236.79 | | 0.34 | 2·13 | | 12·8 | |
| Superintendence and labor | 9,261.51 | | 0.08 | 0·48 | | 2·9 | |
| Fixed charges‖ | 5,736.35 | | 0.05 | 0·30 | | 1·8 | |
| Freight of ore, mineral, and ingot¶ | 19,198.96 | | 0.16 | 0·99 | | 6·0 | |
| Expense** | 1,474.96 | $76,908.57 | 0.01 | $0.64 | 0·08 | 3·98 | 0·4 23·9 |
| | | $321,444.22 | | $2.52 | | 15·59 | 100·0 |

SUMMARY OF EXPENSES.

| | | Per lb. ingot. Per ton. | Cents. | Per cent. |
|---|---|---|---|---|
| Salaries and wages, inclusive of mining contracts | $138,559.23 | $1·04 | 6·43 | 43·2 |
| Supplies and fuel | 75,248.43 | 0.60 | 3·71 | 23·4 |
| Smelting | 25,058.39 | 0.21 | 1·30 | 7·8 |
| Freight of ore, mineral, and ingot | 19,198.96 | 0.16 | 0·99 | 6·0 |
| Sundries | 22,142.42 | 0.17 | 1·03 | 6·8 |
| Construction | 41,236.79 | 0.34 | 2·13 | 12·8 |
| | $321,444.22 | $2.52 | 15·59 | 100·0 |

**Pneumatic Tubes between London and Paris.**—The plan to connect Paris and London with pneumatic tubes has been reported on favorably by French engineers, and submitted to the government. It is proposed that two pneumatic tubes be laid, following the line of the Northern Railroad from Paris to Calais, thence across the channel to Dover, and following the line of the Southeastern Railroad to London. Letters could be thus transmitted between the two capitals in one hour. Wagonettes like those now used to transport telegrams from Paris are to be used, weighing ten kilograms and capable of carrying five kilograms weight of mail matter. Twenty pneumatic trains are to be started every hour. The cost is estimated to be $7,000,000. The total distance is 475 kilometers (about 300 miles).

* In absence of information, the yield of ore mined and hoisted is assumed to be the same as that given for the ore milled.

† Sinking shafts 109 feet, at $13, $1417.25; drifting 1801·7 feet, at $8.54, $15,390.45; stoping 8129·5 fathoms, at $6.02. $48,962.05; sundry contracts, $276; total, $66,045.75; less profit on supplies sold contractors, $13,332.50.

‡ Mining captains, timber-men, trammers, blacksmiths, and other laborers.

§ Including assaying, $302.

‖ Brokerage, $1201.95; insurance, $2251.33; storage, $188.42; telephone rent, $170; taxes, $1924.65.

¶ Railroad expense—Freight of ore from mine to mill—Labor... $3,926.37; Supplies..... 3,151.79; Freight of mineral from mill to smelter 4,024.80; Freight of ingot from smelter to market 8,096.00

** Supplies, $355.65; teaming, $401.76; surveying, $60; sundries, $1280.26; expenses (New York), $4654.55; interest, $562.56; less sundry credits, $1605.31, and rents received, $4234.51.

## THE COPPER MINES OF BUTTE, MONTANA.

We are indebted to Dr. E. D. PETERS, Jr., and to Mr. ALBERT WILLIAMS, Jr., of the United States Geological Survey, for the following particulars concerning the important Butte copper deposits; to Dr. PETERS, for kindly placing at our disposal his private notes, from which he prepared an article on this subject for the United States Geological Survey; to Mr. WILLIAMS, for permission to use them in advance of the appearance of his official report. We are also indebted to Mr. S. RAUNHEIM for the accompanying map of the copper belt.

The high position that Butte City, Montana, now occupies as a producer of the precious metals—standing second only to Lake Superior in its shipments of copper, and ranking among the first in its production of silver—has naturally attracted much attention among those interested in mines and metals.

That portion of the Butte camp that up to the present time alone possesses especial interest to the miner may, roughly speaking, be mostly inclosed within the lines of a rectangle, having a length of two and a half miles, and a breadth of one mile. This rectangle extends from Yankee Doodle Gulch on the east to a point somewhat below the Boston & Colorado concentrator on the west, and from the northern extremity of Walkerville District on the north to the extension of Park Street on the south. Within these narrow limits, are the three great silver mines, the Lexington, Moulton, and Alice; the Anaconda, Parrot, Colusa, Bell, Liquidator, Gagnon, St. Lawrence, Mount View, Clear Grit, and several other noted and productive mines, besides the whole system of silver-bearing manganese leads, and an almost indefinite number of veins, more or less developed, but not yet largely productive.

Outside of this small area, although there is no lack of prospects, some of which promise exceedingly well, none can yet be classed among the paying mines.

The geology of this rich metalliferous rectangle is at first glance exceedingly simple, consisting apparently solely of a coarse-grained and very hard granite, containing an undue proportion of quartz and mica, and less feldspar than is usual. On closer inspection, it will be noticed that, while in the eastern or cupriferous portion of the area mentioned the granite is exceedingly coarse-grained and shows no sign of stratification, in the western or argentiferous division, the mica predominates and is arranged to a greater or less extent in parallel layers, approaching the structure of a mica schist.

The feldspar is apparently all orthoclase, while both the black and white varieties of mica—biotite and muscovite—occur, though in widely different proportions at different points. There appears to be a regular and well-marked connection between the structure of the granite and the contents of the fissures by which it is traversed.

The miners universally speak of porphyry dikes, that run parallel with and usually form the walls of all the large copper veins that have been opened to any great depth. But these so-called "porphyry dikes" seem to be merely altered granite, in which, apparently, the solutions flowing through the vein and saturating its walls to a considerable distance have decomposed the feldspar and frequently the mica, leaving the fragments of quartz that once helped to form the granite surrounded by and imbedded in the silicate of alumina, which now represents the feldspar, and altogether yielding a belt of rock parallel with the vein and bearing a remarkable resemblance to porphyry. In other cases, the results of decomposition have been such that the altered granite resembles a fire-clay, containing angular fragments of quartz. This is often used where refractory material is required, and though not equal to a good fire-clay, will still stand a very high temperature without melting.

As even an imperfect attempt at classification is preferable to complete chaos, the Butte veins may be divided into two great classes.

First, *copper veins*, carrying more or less silver.

Second, *silver veins*, carrying little or no copper, and having a manganese gangue.

One or two of the most noted Butte mines, the Gagnon and its extensions, can not be classed under either of these divisions, and must be described separately.

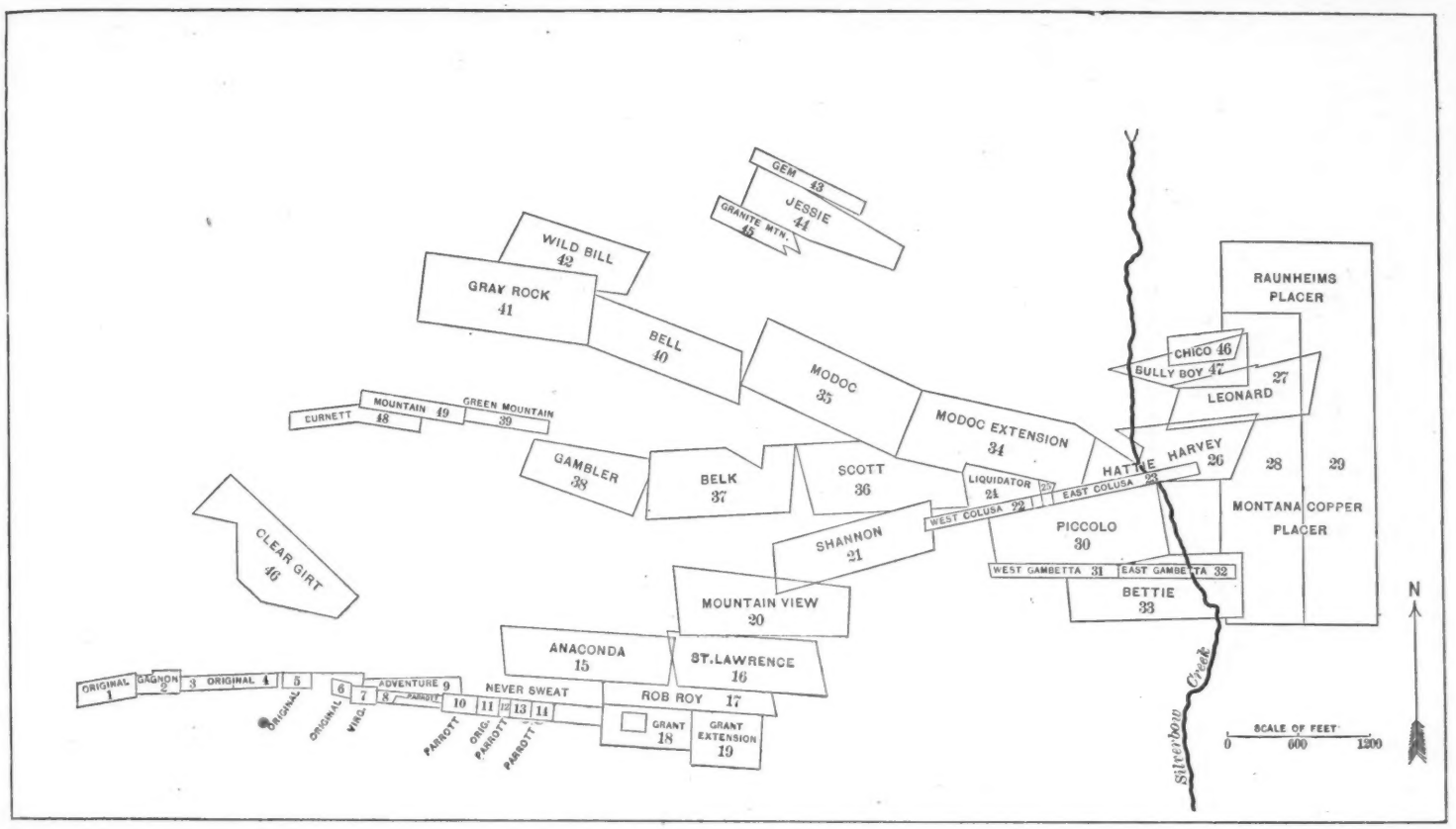
The first group embraces the Anaconda, the Parrot, Liquidator, Bell, etc.

The *copper veins* usually appear on the surface as wide bands of a quartzose rock, much decomposed and heavily stained with oxides of iron. Carbonates and oxides of copper appear mostly only as stains, so that there is little indication of the immense value below. This surface ore invariably carries silver, generally in a free-milling condition, and in most of the larger veins in sufficient quantities to pay for treatment. In fact, nearly all the mines that are now considered distinctly as copper leads, such as the Anaconda, Parrot, etc., were first treated exclusively as silver properties, assaying from ten to sixty ounces, and averaging perhaps twenty ounces. This surface ore continues until the water-line is reached, at a depth of from fifty to one hundred and fifty feet, when, without warning, it changes at once into the base ores that now constitute the principal value of these veins. These ores are somewhat indefinite compounds, resembling copper glance, erubescite, peacock copper, and some indefinite mixtures of copper, iron, and sulphur. Neither the Butte copper glance nor the erubescite agrees exactly, either in its physical or chemical characteristics, with the mineralogical description of these compounds, and a careful study of them would amply repay any skilled mineralogist.

A small quantity of copper pyrites is also found; but though most of the copper ores are slightly arsenical, nothing resembling Fahlerz (gray copper ore) has yet been found.

The condition in which the silver occurs in the free-milling ore is yet undetermined. The miners speak confidently of large amounts of chlorides, bromides, "carbonates," and even "oxides" of silver; but aside from small quantities of chloride of silver, none of these salts of silver has been found. Below the water-line, the silver is principally contained in the erubescite and copper glance, very small assays being obtained from either pyrite or chalcopyrite. But I am also inclined to think that it occurs largely as a thin coating of sulphide on the cleavage-planes of the peacock ore, as frequently, on breaking open such ore-masses, the whole plane is found plated with a thin coating of native silver, which has evidently resulted from the reduction of argentic sulphide.

Perhaps the next most noticeable feature of the Butte copper veins is their great size and remarkable continuity. It is not at all uncommon




**THE BUTTE COPPER BELT.**

Nos. 15-19, Anaconda, St. Lawrence, Rob Roy, Grant Extension; owned or controlled by Anaconda Mining Company (Haggins & Tevis). Nos. 22, 23, 26, 27, West Colusa, East Colusa; Nos. 28, 29, 32, 33, Hattie Harvey, Leonard; Nos. 44, 45, 38, 39, Bully Boy, ½ Chico, Bettie; No. 11, 200 feet, Original Parrot; No. 14, 200 feet, Second Parrot; Nos. 30, 46, 47, Gambler, Green Mountain, Jessie, ½ Granite Mountain, East Gambetta, Irene, 150 acres placer ground; owned or controlled by Montana Copper Company (Lewisohn Brothers). Nos. 10, 12, 400 feet Parrot; Nos. 8, 9, Parrot, Adventure; Nos. 5, 6, Original A and B; owned or controlled by Parrot Copper and Silver Company (Farrel). No. 49, Bell; owned or controlled by Bell Copper and Silver Company. No. 24, Liquidator; owned or controlled by Liquidator Mining Company. Nos. 25, 30, 31, Colusa Fraction, ½ Piccolo, ½ West Gambetta; Nos. 3, 42, Original, ½ of Wild Bill; owned or controlled by Clark's Bank. No. 2, Gagnon; owned or controlled by Colorado & Montana Smelting Company. No. 1, Original; owned or controlled by National Butte Mining Company. No. 41, Gray Rock; owned or controlled by Silver Bow Company. Nos. 48, 49, Mountain, Burnett; owned or controlled by Mountain Consolidated Company. N. B.—On this map are only indicated such mines as produce copper at present, or are expected by further developments to become copper producers. All leads, either showing silver by actual developments or by outcroppings, are left out.

The Gagnon mine (No. 2) is the chief provider for the Boston & Colorado Smelting-Works, situated one and a half miles south of the town. The Clark's Colusa Fraction (No. 25), 175 feet in length, smelts its ores in furnaces erected at the Boston & Colorado Smelting-Works. The Parrot Company's reduction-works, one and a half miles southeast of the town, receive their ores from the Parrot mines No. 10. The Bell mine (No. 40) reduces its ores at smelting-works situated two miles southeast of the town. The Anaconda and St. Lawrence (Nos. 15, 16) ship their ores to their reduction-works thirty miles west of Butte to Warm Creek Springs. The Mountain View (No. 20) ships some high-grade ore to the Baltimore Refining-Works. The Liquidator mine (No. 24) shipped its ores East. The Clear Grit (No. 46) and Ramsdell Parrot (No. 13) reduce ores at the custom ore smelters. The Montana Copper Company has as yet worked extensively only the East Colusa (No. 23) and Hattie Harvey (No. 26); started last year to develop the Original Parrot (No. 11), and has done on the Green Mountain (No. 39), West Colusa (No. 22), and other claims sufficient work to satisfy itself that the ground may be made productive whenever desired. The Gagnon and neighboring mines carry about two ounces of silver to the unit of copper; the East Colusa, Green Mountain, Clear Grit, Gambetta, one ounce to the unit; the Bell and the Gray Rock, one and a half ounces to the unit. The remainder carry between one third and one half ounces to the unit of copper. Two railroads connect with Butte. The Northern Pacific hauled in 1884 from Butte 21,206 tons of copper ore and 4730 tons of matte. The Union Pacific hauled in 1884 from Butte 12,056 tons of copper ore and 11,968 tons of matte, containing about forty million pounds of fine copper, of which about three million pounds were a balance left on hand from 1883. It is expected that the yield for 1885 will be forty-five million pounds. Unfortunately, prices of copper are too low to allow the opening of other valuable copper mines indicated on this map.

to find the vein thirty feet in width for several hundred feet of its course, and filled with ore assaying from 5 to 18 per cent of copper, from wall to wall, for its entire distance.

The first-class ore is distributed with little regard for regularity, in chutes, chimneys, pockets, kidneys, and every other conceivable form, and on an average may constitute one tenth of the entire ore. Where the various mines differ so greatly in both strength and quality, it is difficult to give average figures with any approach to accuracy; but the average width of pay ore in the principal copper veins may probably be safely put at seven feet. The Anaconda is the widest of any yet opened, averaging certainly over twelve feet of profitable ore, and in many places widening to thirty and forty feet for a great distance. In order to show the unusual depth that this erubescite ore attains in this district before being replaced by the poorer yellow sulphides that doubtless form the normal unaltered ore of these veins, I will mention here that the 800-foot level of the Anaconda shows no diminution in the richness of the ore.

The Parrot and the Liquidator also carry exceedingly strong ore-bodies, and of remarkable continuity.

For convenience of more minute description, the copper veins may be classed in two subdivisions:

First. Those in which the copper is found mainly in the shape of copper glance, or a mineral greatly resembling copper glance, though not containing quite the amount of copper called for by the formula Cu S.

Second. Those veins in which erubescite is the principal copper-bearing mineral.

The Anaconda and the Liquidator are good examples of the first division, having as a rule a gangue rock of quartz and decomposed feldspar, and carrying scarcely any other ore except copper glance and a small percentage of pyrite, thus yielding concentrates of a very high grade; while the first-class ore, which is now sacked and shipped to Europe, consists entirely of high-grade, forming perhaps, both as regards quality and quantity, the finest shipping product in the country. The Liquidator and Colusa also furnish a very large amount of second-class ore that is sufficiently free from pyrite to concentrate to thirty per cent and over, though in the lower levels, as might be expected, the proportion of pyrite has decidedly increased.

The second division is represented in its most perfect type by the great Parrot vein and its eastern extension, and for some two thousand feet carrries an almost uninterrupted ore-chute as far as explored. It is characterized by its high percentage of erubescite, carrying nearly its entire copper contents in the shape of that mineral, the occurrence of copper pyrites being rare and unimportant. The first-class ore can be easily selected to thirty per cent, while nearly the entire vein, from five to thirty feet in width, is suitable for concentration, sampling easily twelve per cent as the average of three years' working.

But it is not alone as a copper vein that the value of the Parrot must be estimated; it is also a silver-bearing lead of great value, carrying on an average two thirds of an ounce of silver to each per cent of copper, while above the water-line, to a depth of eighty feet or more, there is a fine body of free-milling silver ore of great strength and value untouched.

The value of nearly all these veins is considerably enhanced by the fact that to a depth of 800 feet no serious amount of water has been encountered, and that, where proper appliances have been introduced, natural ventilation suffices to keep the air in a perfectly good condition. The country-rock is also of such a quality that no difficulties are encountered in timbering, beyond such as naturally arise in working out an ore-body of from thirty to forty feet in width, and which supplies no barren material for filling.

**Professor Agassiz's Gifts** to Harvard College during the last thirteen years amount to more than $500,000.

**Origin of the Spanish Earthquakes.**—M. Hébert has sent the Academy of Sciences, Paris, a note on the earthquakes in the south of Spain. He says that these disturbances, the most serious that have been recorded within the historic period in Spain, must be attributed exclusively to local causes, and especially to the structure of the soil, which is there formed of secondary strata, folded, overlapped, broken by numerous faults, and often traversed by old and recent eruptive rocks.

**Precipitated Gold in Nature.**—A paper on peculiar modes of occurrence of gold in Brazil has been published by Mr. Orville A. Derby. A specimen in the National Museum, Rio de Janeiro, taken from Ponte Grande, Minas Geraes, shows films of gold on limonite, which Mr. Derby thinks can scarcely be accounted for on any other hypothesis than that the gold had been deposited in nature from gold in a state of solution. There are in the districts of Campanha and S. Gonçalo large gold-bearing deposits in decomposed gneiss with an almost entire absence of veins and of the other usual concomitants of gold.

## EFFECT OF THE CHEMICAL AND PHYSICAL INFLUENCES OCCURRING IN PRACTICE ON BASIC FIRE-PROOF MATERIALS.*

By A. Wasum, Bochum.

Since the introduction of the Thomas-Gilchrist process, the bases calcium and magnesium, and the mixture of both known as dolomite, occupy a very important place among the fire-proof substances. Used alone, their capacity to resist the action of heat is as great as that of the best other refractory materials; but when, in addition to heat, they are simultaneously subjected to chemical action, the case is different. For the purpose of investigating their behavior under the latter conditions, the author undertook a series of experiments, in carrying out which he was guided by the following considerations: The basic fire-bricks used in the production of steel consist of lime, magnesia, or dolomite, with or without some binding material; as a rule, the latter is not used, but when it is, consists in practice exclusively of clay; on this account, only that material was used for the experiments. In all the processes in which basic bricks are employed, they are exposed to the chemical action of the acids and metallic oxides formed, as well as to the high temperature, and therefore the combined effect of these acids and oxides, and great heat, was investigated. As, in the processes referred to, it often happens that the furnaces and smelting apparatus have to be suddenly cooled with water, in order to enable repairs to be undertaken, the result of cooling heated basic bricks with water also formed the subject of experiment. All the experiments were carried out with minerals occurring in nature, that is, dolomite, carbonate of lime, magnesia, and magnesite. The bricks were made in the same way as in actual practice; some of the above materials only, others with the addition of one of the substances the effect of which was to be investigated; these substances were alumina, silica, phosphoric acid in the form of phosphate of lime, and phosphate of magnesia, basic converter slag, iron sesquioxide, and magnetic oxide of iron. All the bricks were subjected to a temperature sufficiently high to melt steel; on cooling, they were measured to determine the contraction that had taken place, then one portion was kept in dry air, to test their durability under these conditions; a second portion was made red-hot again, and cooled with water; a third treated in the same way, but then made red-hot a third time, and kept in dry air until they fell to pieces.

The author gives the results of the experiments in a tabular form, showing the amount and nature of the foreign material mixed with the basic brick, the contraction after heating and cooling for each dimension, the time after which the brick fell to pieces under the various conditions already specified, with notes as to its appearance, etc., in each case. Dolomite and limestone required no binding material in order to form good bricks, but this was not the case with magnesite; in all cases, however, the bricks were much improved by the addition of clay, and when this was used, first-rate bricks could be made of magnesite. If the materials used were not very impure, as much as 5 per cent of clay might be added without materially affecting the capacity of the bricks to resist heat. The experiments showed that, for all the purposes required, magnesite and magnesia were the best materials, as they had a much greater durability than the other substances tried, many of the bricks formed of them lasting over three months after being subjected to the treatment mentioned, while the best of those made of carbonate of lime or dolomite fell to pieces after periods varying from a day to a month, according to the treatment and the admixture of foreign substances. As regards contraction, bricks of magnesite and magnesia are much superior to those of lime and dolomite. The following analyses show the composition of the magnesite, dolomite, and limestone used:

| | Per cent. | | | Per cent. | |
|---|---|---|---|---|---|
| Magnesia | 44·98 | Magnesite. | Lime | 31·62 | Dolomite. |
| Lime | 1·69 | | Magnesia | 20·19 | |
| Silica | 0·13 | | Silica | 1·70 | |
| Alumina | 0·84 | | Alumina | 0·09 | |
| Iron monoxide | 1·63 | | Iron monoxide | 1·22 | |
| Manganese monoxide | 0·29 | | Manganese monoxide | Trace | |
| Carbonic oxide | 50·57 | | Carbonic acid | 45·35 | |
| Carbonate of lime | | | 98·80 | Limestone. | |
| Insoluble residua | | | 1·07 | | |

**Heating Railroad Cars by Electricity.**—Experiments have recently been made to heat railroad cars by electricity. The heat is produced by passing the current from a Gramme machine into a number of small sheets of lead contained in a hot-water vessel. The results showed that, while it was possible to heat cars in this way, it would be very much more expensive than the methods now in use.

**Aluminium in Leaves.**—Aluminium is now beaten in leaves, and its use in decoration is becoming more and more general. Mr. Levison has proposed the use of aluminium in leaves in place of tin in Leyden jars and similar apparatus. For equal surface, it would cost no more, would be lighter, and would not tarnish. A book containing fifty leaves of aluminium of the usual thickness costs about twenty-five cents in France, and with the necessary thickness for Leyden jars, the same fifty leaves of 26 $cm^2$ would cost five francs ($1).

**Poisonous Coal-Tar Colors.**—At the great aniline works located at Hochst-on-the-Main, Germany, where nearly seven hundred persons are employed, particular observations have been made for many years with the view of determining the effect of that industry upon the health of the operatives. The products manufactured at these works are very numerous, including many finished dyes of various colors, in addition to nitro-benzole, aniline, and alizarine. It is known that nitro-benzole is poisonous, yet among the twenty-four men employed at Hochst, in the nitro-benzole house, during the last four years, symptoms of "nitro-benzonismus" appeared in only five cases. Aniline, also, is admittedly poisonous; and of twenty-nine men in the aniline house at Hochst, there were eighteen cases of specific aniline poisoning, none of which proved fatal. The workmen in the magenta house were always reddened with the dye, even to the inside of the mouth, and some of the material must, therefore, have been swallowed, yet not a single case of specific ailment has occurred among them for eighteen years.

* From the *Verhandlungen des Vereins zur Beförderung des Gewerbfleisses*; through *Mining Proceedings of the Institution of Civil Engineers.*

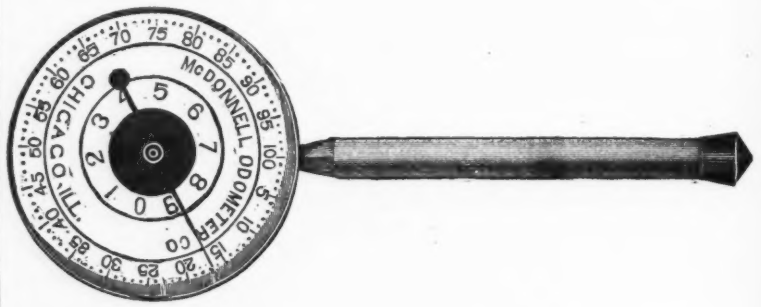
## REPORT OF THE COMMITTEE ON GAS.

General Tremain favors the publication of the reports of the gas companies the same as those of the insurance companies. He argues that the State also has the power to regulate the price of gas. There should be some limitation of the dividends and the amount of the capital of the gas companies. The gas companies, he asserts, are doing a business on a pretended capital of $47,000,000, which could be done on a capital of only $20,000,000. Yet dividends are paid upon the watered stock.

The evidence shows, General Tremain asserts, that the price of gas could be reduced to $1.50 a thousand feet, and yet the companies would pay 10 per cent on the capital invested. He is of the opinion that three State gas supervisors should be appointed by the Governor and Senate, whose duty it should be to supervise the gas companies and prevent their making extortionate charges. The investigation showed that the system of inspection of meters by the State gas inspectors was a farce; there being only four inspectors and tens of thousands of gas-meters. It was shown that consumers have paid bills larger instead of smaller since the consolidation of the companies. Water-gas was found to be superior to coal-gas as produced, the former having from 23 to 30 candle-power, while the latter was from 19 to 20. "If the calculation be made," says General Tremain, "on the actual money paid in by the stockholders of the companies, it will be found that consumers have paid enough over and above the cost of production and 10 per cent profit to duplicate the present gas system in New York. In 1883, the average cost of producing gas was 60 cents, while the average charge to consumers was $2.16. Fully 50 per cent of the amount paid for gas in New York in the last ten years ought to have been returned to consumers in the way of reduction of prices. The total number of mains was found to be 847, while the number of miles of streets actually lighted is only 442. The mains are double in amount the number actually required."

## LIGHTNING SPEED INDICATOR.

The engraving represents a new speed indicator, or revolution counter, for which great accuracy in its indications is claimed. It is guaranteed to work at a speed as high as 10,000 revolutions per minute. It is provided with two dials, the outer one stationary and the inner one movable. The outer dial registers revolutions to 100, and the inner one to 1000. The inner dial receives a motion from differential gearing that revolves it enough slower than the hand to lose one of the divisions




during a revolution, so that, by observing the inner dial, the hundreds of revolutions are seen, and the single revolutions are read from the outer dial.

The tip is of rubber, which insulates it when used about electric lighting machinery; it is also claimed that the rubber tip is less liable to slip than the ordinary steel point.

The dial is silver plated, and the entire mechanism protected from dust by a heavy, tight watch crystal.

It is made with four different lengths of spindle, namely, ½ inch, 1 inch, 2 inches, and 3 inches, to suit different requirements.

J. H. Wallace, 25 Maiden Lane, New York, is general agent for these indicators.

## BOOKS RECEIVED.

**[In sending books for notice, will publishers, for their own sake and for that of book-buyers, give the retail price?]**

*Mining Camps.* A Study in American Frontier Government. By Charles Howard Shinn. New York: Charles Scribner's Sons. 1885. 12mo, pages xi+316 (including 9 pages of Authorities Consulted and 8 pages of Index). $2.

Chapter I. Scope of the present investigation. II. Ancient and mediæval mining systems; the codes of the twelfth and thirteenth centuries; Germanic mining freedom. III. Customs of Cornwall; stannary courts, barmotes, and tin-bounds. IV. Early mining in the United States. V. The Spanish-American system of government; mining laws of Mexico. VI. The missions of the Pacific coast. VII. Spanish town government; the pueblo in California. VIII. A study of alcaldes. IX. California camps; the days of '48. X. The earliest mining courts, and their influence on state life. XI. The golden prime of '49. XII. Evidence concerning law and order in the camp. XIII. Illustrations from early and successful camp organizations. XIV. Forms of district government; folk-moot, standing committee, and alcalde. XV. How an alcalde was once deposed. XVI. The miners' justice of the peace. XVII. Organization of town government by the miners. XVIII. The difficulties with foreigners in various camps. XIX. The famous Scotch-Bar decision. XX. Sporadic organizations; cases of mob law. XXI. Local land laws and legislation from 1848 to 1884. XXII. The early relationships of mining and agricultural interests. XXIII. Decisions of California and other courts respecting local laws and customs. XXIV. The extension and permanent influence of mining camp law. XXV. Effects, social and intellectual, upon Western development.

**Slate.**—The production of slate in this country during 1884 was about 510,000 squares.

## A NEW PRESSURE-FILTER.*

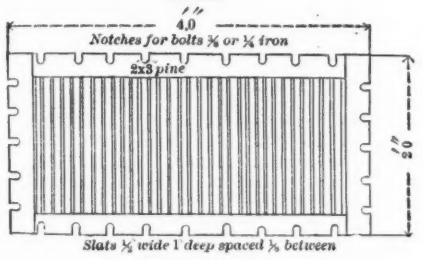
By Richard P. Rothwell, New York.

A year ago, I commenced experiments in precipitating and saving gold from chloride solution, in the course of which I found $H_2S$ (made from paraffine and sulphur) the most convenient and inexpensive precipitant. The gold is thrown down as gold sulphide; and a considerable time is required for this precipitate to settle. Even after it appears to have settled. we find by experience that there is a notable loss of gold, if the clear liquor be decanted off in the usual way.

To remedy this evil, I made a small and very cheap pressure-filter, which has now been used for nearly nine months, and has given the utmost satisfaction. This filter is constructed as follows:

Three frames, about 4 feet by 2 feet, are made of 2-inch by 3-inch pine. Two of these frames are filled in with ½-inch slats leaving about ⅛ inch spaces between the slats, as shown in Fig. 1.

FIG.1



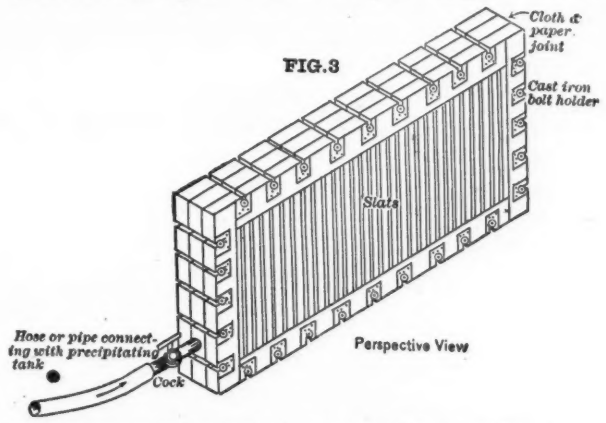

Plan of outer frames

These slats are covered with cloth or drugget, and Swedish filter-paper is laid on the top of the cloth. The notches shown in the figure receive bolts of ⅜ or ½-inch iron, to hold the frames together.

The third frame is of the same size and thickness as the others, but has, instead of slats, only one cross-bar. When the filter is put together, the third frame is placed between the other two, and the cross-bar serves to press on the joint of the filter-paper and keep the two sheets together. This cross-bar is perforated, to permit the passage of the liquid, which enters through a pipe at the end provided with a faucet, and fills the whole filter.

Fig. 3 shows in perspective the filter complete. It will be seen that the middle frame, keeping the other two apart, furnishes a space between them to be filled with liquor. This is brought through a rubber or iron

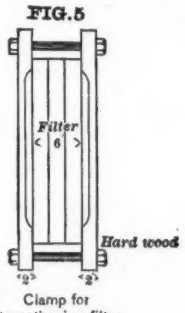
FIG.3




pipe from the precipitating-tank. Since the filter is set on a lower level, any desired head or pressure can be obtained. About five or six feet is generally enough. The liquor passes out through the filter-paper, which collects the gold; through the cloth, which is merely a support for the filter-paper, and then between the slats forming the sides of the filter.

The malleable iron casting screwed on the outside frames, to receive the bolts, may, when loosed a little, be easily lifted out of the notches, and thus the filter is very quickly opened. Before opening, it is laid on a sheet-iron tray. After the filter has been opened, the gold precipitate

FIG.5




Clamp for strengthening filter

is rolled up in the filter-paper, fresh sheets are put in, the frames are again bolted together, and the apparatus is ready for further use.

We strengthen the filter still further by a couple of cross-bars of hard wood, as shown in Fig. 5. This is required by the swelling of the frames, held around their edges by bolts, which tends to loosen the joints of the frames.

The total cost of the filter will not exceed five dollars. It requires no attendance; the cloth lasts indefinitely (since the liquor is necessarily neutral before the gold will precipitate); and we have still the original cloth of one of our filters. Such a filter, 4 feet by 2 feet in size (giving an area of two sheets of filter-paper, and hence containing, on the two sides, four sheets), will filter from fifty to one hundred and fifty gallons an hour, according to the amount of precipitate on the paper. The liquor passes very rapidly through it at first, and more slowly as the precipitate accumulates; but the filtrate is always perfectly clear. When the filtering becomes slow, the faucet is closed, the hose is disconnected, and the chemist and his assistant carry the whole apparatus into the assay-office, where it is laid in a sheet-iron tray, and opened as already described.

No one but the chemist has any thing to do with it; and, standing in a closed box, it attracts no attention.

* A paper read at the Philadelphia Meeting of the American Institute of Mining Engineers, September, 1884.

## THE BALTIMORE & OHIO EMPLOYES' CIRCULATING LIBRARY.

The following general order was issued March 2d, by Robert Garrett, President of the Baltimore & Ohio Railroad Company:

The inauguration of a Free Circulating Library for the employés and the families of employés of the Baltimore & Ohio Railroad Company is announced.

The operations of the library will be conducted by a librarian, acting under the general supervision and control of a library committee, composed of two members of the board of directors of the Technological School; two members of the committee of management of the Relief Association, and a representative of the Baltimore & Ohio Company appointed by the president. Appointments of members of this committee shall be made annually and shall be effective October 1st of each year. The principal instructor of the Technological School and the secretary of the Relief Association shall be *ex-officio* members of this committee.

Rules for the government of the library wil be made and promulgated by the library committee.

Dr. W. T. Barnard, assistant to president, is named, in behalf of this company, as a member of the library committee.

Mr. A. M. Irving is hereby appointed librarian.

The General Manager will see that proper support and co-operation is given this institution by all departments, as being part of a consistent plan for the higher education of those employed by this company.

The following rules have been prepared for the government of this library and are now in force:

1. The head-quarters of the library will be at the rooms of the Technological School, Mount Clare, Baltimore, Md.

2. Its mission being to exert an elevating and educating influence on the employés of the service, and particularly their children, it will supply only current periodicals, standard works on the sciences, general literature, poetry, historical, text and other books of practical utility to engineers, mechanics, firemen, apprentices, and other railroad employés, and such as are especially adapted to educating and elevating the character of the young. Whatever is purely sensational or immoral in tendency will be rigidly excluded from its shelves, and its management will always endeavor to discourage the use of literature from which unhealthy and unreal ideas of life might be drawn.

3. The librarian will also undertake to purchase for—and to forward to—employés, stationery, school, text, and other books at cost price; giving them the benefit of such discounts as can be obtained on large orders.

4. Library committees will be appointed at divisional and principal stations, and at other points agents will be designated through whom those desiring to utilize the library can obtain and return its literature. Lists of such committees and agents will be published from time to time.

5. Catalogues of the library and blank requisitions for books can be found in the offices of agents at first and second class stations, at the offices of the master mechanics, supervisors of trains and road, and in possession of every member of library committees.

Additions to the library will be promptly catalogued.

6. Any employé desiring personally to possess a catalogue will be furnished with one and also with a number of blank requisitions, upon sending to the librarian the sum of 25 cents to repay the cost of the same.

7. Books will be classified under two heads, the first class comprising such works as, from their rarity, value or extent, may not be withdrawn from the library rooms, except when required by instructors of the Technological School, or by employés who have obtained the written approval of the Chairman or three members of the library committee, to take them from the library at stated periods. This class shall include all unbound periodicals and books of reference.

The second class shall embrace all books intended for circulation.

8. Any employé of the company, on furnishing the librarian with his or her name, occupation, department, and indorsement of his or her immediate superior official, or other acceptable credential of responsibility, may draw books from the library. Presentation of certificate of membership in the relief association, and identification, will be accepted as sufficient credentials. Members of the households of employés may exercise the same privileges as employés themselves, and upon the same conditions; but those unknown to the librarian or library committees to whom they apply for library privileges must be fully identified by responsible persons. Library committees, agents, and others intrusted with the distribution of literature, etc., are prohibited from delivering the same to any other person than those to whom addressed or to some known member of his or her family, and will be held responsible for the wrong delivery of books.

9. Requisitions for books will be made on cards bearing on the reverse side the address of the librarian, which must be countersigned by the agent or library committee to whom the book is to be sent, and which can be forwarded by train service as other railroad communications—the books called for being issued and returned through the same channel, in the order set down on the list. Requisitions will be returned by the librarian to the library committee, agents, or other persons distributing books to be held until the books are collected; when each borrower's requisition will be returned to him or her. Possession of the requisition by the borrower will relieve him or her of all responsibility in regard to th books represented by that requisition; while its being in custody of th

library committee or agent will, in case of loss, be considered proof that the borrower has not returned the book.

10. No book will be taken or sent out from the library until its title and the name of the borrower shall have been registered by the librarian.

11. Account will be opened with each employé or member of his or her family using the library, and while every care will be exercised in issuing and collecting books, they will be charged to those calling for them as soon as issued, and such charges will be canceled only when the books are returned to the library. No employé shall be permitted to take out more than one book (or two volumes of one work) at a time, without written permission, signed by the chairman or three members of the library committee.

12. Books must not be kept beyond two weeks (except educational works, which may be retained three weeks), unless the requisition be renewed and possession acknowledged at the end of each bi-weekly period, dating from the day the work was issued from the library. The loan of a book will be renewed but once, if there are other applicants for it. A margin of three days will be allowed to cover time consumed in transmittal. No books, except technical works, will be allowed to remain in the possession of an employé beyond three months. Books returned will not be reissued until they have been examined and replaced upon the shelves.

13. A fine of one cent will be imposed for each day books are retained beyond the period within which they should be returned, or requisitions renewed under this rule.

14. No borrower shall lend a book to any other person than those belonging to his or her household. They are expected to use books with care, and to keep them clean and neat.

15. While no fine is imposed upon borrowers for the loss of books, those found guilty of willfully losing, mutilating, or defacing the works, pamphlets, or other property belonging to the library will be debarred from its privileges until the lost books shall be replaced or paid for, or full reparation made for the damage sustained.

16. To each package of books sent to the library on requisition, a distinctly written label will be securely attached, addressed to the library committee or other person charged with the delivery of the books therein contained. Each package will be serially numbered. The librarian shall enter in a receipt-book the serial number, date of transmission, and address on each package, and the baggage-master, agent, or other authorized person to whom such packages are delivered for transmission will receipt therein for each separate package, which will be invoiced and otherwise treated as the Baltimore & Ohio Company's property in transit.

17. Each library committee or person charged with the collection of books will, in returning them, pursue precisely the same course as that taken by the librarian in distributing books—wrapping them in strong paper, with the librarian's address prominent thereon.

18. The transportation of books from or to the library shall not be at the risk of the person sending or receiving them, when forwarded through the company's officials charged with the care of its train mails, or other like property, and receipt produced therefor.

19. The value of any library property retained by an employé (or member of his household) leaving the service of the company will be deducted from his wages.

## PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED FEBRUARY 3D, 1885.

311,483. Apparatus for Manufacturing Gas. Arthur O. Granger and Joseph H. Collins, Jr., Philadelphia, Pa.
311,484. Gas-Generating Apparatus. Arthur O. Granger, Philadelphia, Pa.
311,493. Apparatus for Generating Gas. Ira James, Mattoon, Ill.
311,543. Process for Refining, Reducing, and Separating Hydrocarbon Oils. Ebenezer W. Strain, Alleghany City, Assignor to himself and Robert P. Crawford, Lower Burrell Township, Westmoreland County, Pa.
311,557. Drying Apparatus for Brick and Tile Kilns. Chester L. Ames, Cabery, Ill.
311,585. Hydraulic Main for Gas-Works. Charles W. Isbell, New York City.
311,588. Rail Rolling-Mill. Henry C. Kriete, Chicago, Ill.
311,595. Production of Sulphurous Acid. Isaac S. McDougall, Irk Vale, Chatterton, near Manchester, County of Lancaster, England.
311,656. Apparatus for Laying Submarine Tunnels and Tubes. Hayden H. Hall, New Hamburg, New York.
311,694. Apparatus for the Manufacture of Artificial Stone. C. Irvine Walker, Charleston, S. C., Assignor to the Stoney Landing Company, same place.
311,699. Apparatus for Recovering Volatilized Metals. Arthur F. Wendt, New York City.
311,709. Drilling-Machine. Euclid Anderson, Peekskill, New York.
311,729. Asbestos Packing. John Dewrance, Lambeth, County of Surrey, England.
311,740. Barbed-Wire Fence. Franklin D. Ford, Providence, R. I., Assignor of one half to Cornelius S. Sweetland, same place.
311,747. Fluid Regulator and Cut-off. James T. Hambay, Pittsburg, Pa., Assignor to George Westinghouse, Jr., same place.
311,748. Metal-Extracting Apparatus. Walter Hamilton, New York City, Assignor to the Acme Mining Machine Company, same place
311,749. Metal-Extracting Apparatus. Walter Hamilton, New York City, Assignor to the Acme Mining Machine Company, same place.
311,750. Covering for Steam-Pipes. J. Milton Hammill, Philadelphia, Pa.
311,773. Elevator for Hoisting and Lowering and Automatically Discharging Barrels, etc. Henry McQuire, Chicago, Ill., Assignor to the Link Belt Machinery Company, same place.
311,786. Rock-Drilling Machine. Jeremiah M. Richardson, Salt Lake City, Utah, Assignor of one third to Joseph L. Heywood, same place.
311,789. Coal or Ore-Bucket or Carrier. Albert W. Simmerly, Cleveland, Ohio.
311,802. Puddling and Heating-Furnace. Thomas H. Bennett, Ironton, Ohio, Assignor of two thirds to D. Linn Gouch, same place, and A. L. Stout, Dayton, Ohio.
311,804. Calcining and Chloridizing Furnace. William H. H. Bowers, Salt Lake City, Utah.
311,823. Method of Booking Gold-Leaf. Edward Ewing, Philadelphia, Pa., Assignor to Robert E. Hastings, John V. Hastings, and Harry O. Hastings, all of same place.
311,830. Manufacture of Iron and Steel. Joseph Grottenthaler, Alleghany, Pa., Assignor of one half to Philip J. Huber and William P. Koonsman, both of same place.
311,863. Ore-Concentrator. Jacob Cherney and William C. Davis, Denver, Colo., Assignors to said Cherney and Francis M. Davis, same place.

GRANTED FEBRUARY 10TH.

311,874. Boiler-Furnace. John Collis, Des Moines, Iowa.
311,883. Belt-Coupling. James England, New York City, Assignor to Isaac S. McGiehan, same place.
311,895. Manufacture of Hydraulic Cement. David Griffiths, Egypt, Pa.
311,899. Automatic Feeding-Table for Rolling-Mills. Robert W. Hunt and Maximilian M. Suppes, Troy, New York, said Suppes Assignor of one sixth of his right to said Hunt.
311,920. Rolling-Mill for Rods. John T. Rowley, Johnstown, Pa.
311,954. Machine for Forming Spring-Teeth. Elijah P. Burns, Detroit, Mich., Assignor to the Detroit Steel and Spring Works, same place.
311,966. Device for Lubricating Bearings. Gustaf de Laval, Stockholm, Sweden.
311,967. Method of and Apparatus for Enriching and Burning Water-Gas. Charles J. Eames, New York City.
312,008. Loom for Weaving Wire Fabric. Thomas Patterson, Cortland, New York.
312,010. Protected Nitrate of Ammonia for Use in Explosive Compounds. Russell S. Penniman, Jenkintown, Pa., Assignor of one half to John C. Schrader, McCainsville, New Jersey.
312,037. Sectional Non-Conductive Covering for Tubes. William M. Suhr, New York City.
312,045. Process of Annealing Copper Wire. William Wallace and Thomas J. Wood, Ansonia, Conn.
312,057. Composition for the Manufacture of Artificial Stone. James L. Wray, Watseka, Ill.
312,060. Shipping Device for Metal Planing and Shaping Machines. John H. Wright, Bridgeport, Conn.
312, 065. Attachment for Vapor-Burners. Amos P. Avery, Plain City, Ohio.
312,066. Brick-Machine. Harry L. Balsom, De Soto, Mo.
312,067. Valve for Vapor Burners. David E. Bangs, Medford, Mass.
312,068. Machine for Sawing Stone. Valentine G. Barney, Charles City, Iowa.
312,069. Sand and Water-Pump. Valentine G. Barney, Charles City, Iowa.
312,093. Core Rock-Drill. Lewis D. Conner, Oberlin, and Charles F. Peebles, Berea, Ohio.
312,103. Method of Boxing Lead Pipe. Alexander Easton and John P. Neville, St. Louis, Mo.
312,142. Method of Deoxidizing the Surface of Sheet-Metal. Edward V. McCandless, Pittsburg, Pa.
312,143. Fire-Front. Patrick McCauley, Braddock, Assignor of one half to Thomas E. Neville, Pittsburg, Pa.
312,146. External Friction-Brake Band for Hoisting Machinery. Daniel H. Merritt, Marquette, Mich.
312,172. Removable Oven for Combined Coal and Gas-Burning Stoves. Henry H. Sheldon, Pawtucket, R. I., Assignor to Philip C. Sheldon, same place.
312,188. Spool for Barbed Wire. George Case, Joliet, Ill., Assignor to William T. Conklin, same place.
312,207. Coal-Chute. Moses D Jones, Jackson, Ohio.
312,212. Machine for Tapping Metal Pipes and Fittings. Thomas G. Morse, Erie, Pa.
312,213. Rolling-Mill for Rails. Arthur J. Moxham, Johnstown, Pa.
312,236. Sheet-Metal Cutting Machine. Christian Wais, Newport, Ky.
312,240. Amalgamator. Rowland J. Atcherley, London, England.

GRANTED FEBRUARY 17TH.

312,247. Vapor-Burner. Clearmont V. Best, Canton, Ohio.
312,266. Rod Plumbing-Level. William Gurley, Troy, New York, Assignor to himself and Lewis E. Gurley, same place.
312,293. Furnace-Grate. John A. Price, Scranton, Pa.
312,301. Method of Manufacturing Sheet-Metal Pipe. John F. Starr, Jr., Camden New Jersey.
312,303. Apparatus for Bending Metals Bars. John H. Thomas, Springfield, Ohio.
312,304. Hand-Power Rock-Drill. Lewis W. Tracy, Brooklyn, New York.
312,318. Apparatus for the Conveyance of Fluids. John F. Bennett, Pittsburg, Pa.
312,331. Ash-Pan and Screen for Furnaces. Richard S. T. Cissel, Elizabeth, New Jersey.
312,333. Apparatus for Separating or Concentrating Materials of Different Specific Gravities. Alfred E. Crow and William L. Crow, New York City.
312,338. Pulverizer. Thomas C. D'Spain, Sherman, Texas.
312,343. Rock-Pulverizer. David C. Ebaugh, Charleston, S. C.
312,346. Rotating Feed for Steam Rock-Drills. Joseph C. Githens, New York City, Assignor to the Rand Drill Company, same place.
312,347. Rotatory Feed for Steam Rock-Drills. Joseph C. Githens, New York City, Assignor to the Rand Drill Company, same place.
312,348. Steam Rock-Drill. Joseph C. Githens, New York City, Assignor to the Rand Drill Company, same place.
312,356. Artificial Stone. John D. King, Fairbury, Neb., Assignor of one half to William P. Freeman, same place,
312,371. Apparatus for Forcing Air. Orson Millard, Flint, Mich.
312,383. Rotatory Feed for Rock-Drills. Edward E. Quimby, Orange, New Jersey, Assignor to the Rand Drill Company, of New York City
312,401. Machine for Making Twist Drills. George R. Stetson, New Bedford, Mass., Assignor to himself and the Morse Twist Drill and Machine Company, same place.
312,404. Die for Making Barbed Fencing. Anson P. Thayer, Brooklyn, New York, Assignor to Thomas W. Hall, same place.
312,412. Support for Rock Drilling Machine. John B. Waring, New York City, Assignor to the Ingersoll Rock Drill Company, same place.
312,417. Apparatus for Annealing Wire. Lewis Williams, Johnstown, Pa., Assignor to Cambria Iron Company, same place.
312,439. Slag-Buggy. Walter B. Devereux, Aspen, Colo.
312,440. Barbed Fence. George de Walt, Kenton, Ohio.
312,452. Incandescent Light. Otto B. Fahnehjelm, Stockholm, Sweden.
312,454. Barbed-Wire Fence. Franklin D. Ford, Providence, R. I., Assignor of one half to Cornelius S. Sweetland, same place.
312,470. System for Distributing Gas under Pressure. William A. Hoeveler and Thomas J. McTighe, Pittsburg, Pa.
312,472. Grate for Boiler-Furnaces. Charles H. Holt, Philadelphia, Pa.
312,485. Combined Lead and Iron Plate. John Makin, Glossop, County of Derby, England.
312,494. Gas-Engine. Lewis H. Nash, Brooklyn, Assignor to the National Meter Company, New York City.
312,496. Gas-Engine. Lewis H. Nash, Brooklyn, Assignor to the National Meter Company, New York City.
312,497. Gas-Engine. Lewis H. Nash, Brooklyn, Assignor to the National Meter Company, New York City.
312,498. Gas-Engine. Lewis H. Nash, Brooklyn, Assignor to the National Meter Company, New York City.
312,499. Igniter for Gas-Engines. Lewis H. Nash, Brooklyn, Assignor to the National Meter Company, New York City.
312,537. Rock-Drill. Charles S. Westbrook, Sprague ville, New York.
312,538. Rock-Drill. Charles S Westbrook, Sprague ville, New York.
312 539. Support for Rock-Drills. Charles S. Westbrook, Sprague ville, New York.
312,540. Support for Rock-Drills. Charles S. Westbrook, Sprague ville, New York.
312,541. Means for Detecting Leaks in Gas-Mains. George Westinghouse, Jr., Pittsburg, Pa.
312,542. Means for Detecting Leaks in Gas-Mains. George Westinghouse, Jr., Pittsburg, Pa.
312,543. Pressure-Regulator and Cut-Off. George Westinghouse, Jr., Pittsburg, Pa.
312,547. Machine for Bending the Ends of Bars. Anders Andersen, Copenhagen, Denmark, Assignor to the Kjöbenhavns Hesteskofabrik, same place.
312,578. Door for Furnaces. William O. Nightengale, McKeesport, Pa.
312,586. Process of Preparing Ores for Amalgamation and Desulphurizing the same. Charles R. Squire, Brooklyn, New York, Assignor of one half to James F. Hotchkiss, Plainfield, New Jersey.
312,587. Treatment of Ores for Amalgamation. Charles R. Squire, New York City, Assignor of one half to James F. Hotchkiss, Plainfield, New Jersey.

REISSUE.

10,561. Means for Detecting Leaks in Gas-Mains. George Westinghouse, Jr., Pittsburg, Pa.

## FURNACE, MILL, AND FACTORY.

The extension papers of Oliver Brothers & Phillips, of Pittsburg, Pa., who recently suspended, have been signed by all the creditors. The agreement required only ninety per cent, but it was thought best to have all sign if possible, and that has been accomplished. The works were closed on March 21st, for the purpose of taking stock, and it is expected that operations will be resumed within a week, under the administration of the trustees.

The Westlake Rolling-Mills, Warren, Ohio, which have been idle for months since the failure of C. Westlake & Co., will be worked by the Warren Co-operative Iron Company, formed by the late employés and citizens who subscribed. The employés devote six weeks' wages to the security of the enterprise. Already about $6000 of the $20,000 necessary is subscribed.

Worthley, Downes & Co. (the Eastern Rubber Company), Boston, Mass., have gone into insolvency. Their liabilities are $101,142; assets, nominally from $50,000 to $60,000. The firm offers thirty cents on the dollar, payable in 5 per cent installments.

The nail factory and nail plate mill of the Pottstown Iron Company, at Pottstown, Pa., shut down March 21st, and will remain closed for a short time. Lack of orders and want of storage room are the causes.

The Philadelphia Bridge-Works, at Pottstown, have been short of work lately, and the greater part of the force has been laid off.

The works of the Boston Machine Manufacturing Company, in South Boston, Mass., were burned March 20th. Loss, $175,000.

The largest locomotive ever built has just been finished by the Baldwin Company, Philadelphia, Pa., and will be sent to Brazil. Its weight is 224,000 pounds.

The American Iron and Glass Pipe and Plate Company, Haverhill, Mass., is financially embarrassed. The liabilities are said to be about $28,000.

The A. Burritt Hardware Company, of Waterbury, Conn., manufacturers of steam, gas, and water-pipe fittings and general iron founders, have made an assignment. The liabilities are, exclusive of the capital stock, $115,000. The assets are $175,000.

P. A. Ahl & Brother, stock dealers, of Newville, Pa., who assigned a short time ago, have $300,000 liabilities and $500,000 nominal assets. The actual assets are $300,000. The real estate embraces a large interest in the Antietam Iron-Works, Maryland Ore-Banks, and furnaces at Boiling Spring, Va., and 8500 acres of land.

Work in the melting department of the steel-works, Cumberland, Md., has been resumed after a stoppage of over three months. The works are running about on the same scale that they have been for the past six months. The extension to the works is about completed, but operations in the new portion have not been commenced.

The furnace at Roger, near Hollidaysburg, Pa., commonly known as Springfield Furnace, has been blown out and shut down.

The Harrison Wire-Works corporation, at St. Louis, Mo., has sued Lieut. Thomas W. Fitch for $102,279.

Col. John Scott, general manager of the Queen & Crescent line, has closed a contract with J. F. Cahill and Ambrose Wagner, of Chattanooga, Tenn., to manufacture all castings for locomotives and other rolling stock for the whole Queen & Crescent system. All patterns belonging to the system have been removed from Ludlow, Ky., Meridian, Miss., and other points, and placed in position at Chattanooga.

The Chestnut Hill Iron Ore Company, of Columbia, Pa., has sold the Shawnee Rolling-Mill to Messrs. John Q. Denney, of Harrisburg, John Keller, of Lancaster, and Michael Schall, of York. It will be remodeled by them, and will probably be run on skelp and merchant iron. Several months will be spent in making alterations.

Hon. Benjamin Fisher, President of the Anna mine, in Saguache County, Colorado, has been in Pittsburg, Pa., and has contracted for an ore-crusher, milling machinery, and mining apparatus, for use in the mine.

It is said that Graff, Bennett & Co., of Pittsburg, Pa., are arranging for a $500,000 mortgage on their mills, with the funds derived from which they expect to pay off the $537,000 due, as it is believed the creditors will scale down their claims to $500,000.

There is some talk of starting the Bethlehem Iron Company's furnace near Freemansburg, Pa., which has been idle for several months.

The puddle mill of the Bethlehem Iron Company, Bethlehem, Pa., which resumed operations three weeks ago, shut down March 23d. The company has a large stock of the mill's product on hand, and it is feared the mill may not start again until this is disposed of.

The Glendon Iron Company's No. 1 furnace, at Easton, Pa., which was recently blown out, is having its lining removed. New lining will be put in as soon as the weather permits, and the stack put in blast. The company last week shipped a large quantity of iron, but a large supply is still on hand.

Zug & Co.'s new mill has started up. The old mill will probably resume operations soon.

At the Cleveland rolling-mill works, Cleveland, Ohio, with one exception, the mills have been running on double time during the past week. Other iron mills of Cleveland are doing regular and steady work.

The Phœnix Iron-Works, at Phœnixville, Pa., started in full blast in all departments March 23d.

The Judson Powder Company has an exhibit of packages, cases, etc., that attracts considerable attention at the New Orleans Exhibition, in the New Jersey department, showing exact imitations of its mode of putting up its powder. It shows the three leading grades of its explosives, the Judson Powder R.R.P., the Judson Dynamite, F.F.F., and the Judson Dynamite extra. The company manufactures various grades of powder suited to all kinds of work, from a clay bank to the hardest tunnel rock.

The managers of the Iron River furnace, Michigan, intend to put it in blast about the first of August.

The Eddy Valve Company, of Waterford, New York, has just issued a catalogue, giving price-list, illustrations, and descriptions of the various valves and hydrants manufactured by this well-known establishment.

Judge Brewer, in the United States Circuit Court at St. Louis, Mo., made an order of sale, March 26th, of the Vulcan Steel-Works under $1,000,000 mortgage, unless cause to the contrary be shown before April 18th. The sale is to include the right to manufacture Bessemer steel rails.

L. Beckmann, manufacturer of surveying instruments, at Toledo, Ohio, reports that Hodgman steel tapes are winning favor, and he thinks they promise to supersede the chain for surveyors' use, as they are accurate and much more convenient to handle, are light and durable, and much cheaper. Mr. Beckmann has issued a circular and price-list, giving full particulars, with testimonials from well-known engineers and surveyors.

The Garry Iron Roofing Company, of Cleveland, Ohio, which claims to be the largest manufacturer of iron roofing in the world, has adopted an improved adjustable cap-seam that is a simple and secure thing for fastening, and enables the workman to apply the roofing readily and easily, and at the same time renders removal of the roof, when desired, very easy. This company also manufactures fire-proof doors, shutters, etc., also frames for roofs, and takes contracts for buildings complete.

The San Francisco Bridge Company recently made a large blast with the view of obtaining 90,000 tons of rock for constructing a sea-wall at San Francisco. The quarry is a bluff, 60 feet high, at the water's edge, at the mouth of Visitation Valley. Eleven tunnels in all have been run and four have been exploded, 11,000 pounds of Judson powder having been used. Each tunnel was 50 feet long, and extended to an L, in which was the powder. From the L to the mouth of each tunnel, rock and dirt had been tamped in as hard as possible. The four explosions were to occur successively, the first to loosen the cliff and make it easier for the second to become effective, and so on. The first explosion was awaited with some little apprehension by the harbor commissioners and other occupants of the tow-boat. But when it occurred, with a dull, heavy sound, and it became apparent that fragments of stone were not to fly through the air, there was a unanimous desire that the boat should move nearer the shore. The other explosions occurred soon after. No. 3 was a grand affair. A great section of the cliff was toppled over and huge boulders and tons of dirt rushed down to the water's edge. The blasts were pronounced successful, and the quality of stone, on subsequent inspection, seemed satisfactory to the harbor commissioners. It was estimated by the engineers that the 11,000 pounds of explosives had displaced in about ten minutes 35,000 tons of rock and earth.

The Water Committee at Pittsburg, Pa., has awarded the contract for furnishing 1461 tons of plain water-pipe and 75 tons of special castings to R. D. Wood & Co., of the Camden Iron-Works, Philadelphia, for $38,753.32. M. Durbin got the contract for laying 300 feet of pipe at 20 cents a foot.

The lowest bidders at the opening of bids at the District Building at Baltimore, Md., March 25th, were as follows: Iron pipe, Camden Iron Company, $13,053.60; special castings, Fox & Drummand, $980; iron water-gates, J. McClelland; twenty-five fire-plugs, E. G. Smyser, $750.

The Western Nail Association met at Pittsburg, Pa., March 25th, and reaffirmed the card rate. Trade is reported fair and stocks small.

## LABOR AND WAGES.

A bill has passed the Connecticut State Legislature providing that any person or corporation that requires employés, under penalty of forfeiture of a part of their wages, to give notice of intention to leave, shall be liable to a like forfeiture for discharging, without similar notice, any workman, except for incapacity or misconduct, unless in case of a general suspension of labor in his or its shop or factory.

A dispatch announces that a reduction of colliers' wages is expected in the Sheffield District, England. A strike, it is said, would tend to favor the masters, who are already largely overstocked.

The strike in the Pittsburg District continues. At a secret meeting of the striking miners, a committee was appointed to confer with a committee from the Ohio miners as to a scale of prices that would be equitable to the men of both districts. The Ohio miners answered to the proposition through John McBride, their President. In his letter to Secretary Flannery he says: "Much as I approve of your move to determine upon a fair and uniform rate for mining in our district and yours, I am compelled to inform you that our affairs are such that we can not select a committee to meet yours. This would be out of the question just now. When we attempt to adjust the price of mining in our district, we must have nothing else on our hands; too many irons in the fire will injure us. We can only wish you well." Secretary Flannery refused to say any thing concerning the letter, except that he was sorry the committee's plan had failed. It is said that this will virtually break the backbone of the strike. It is rumored that the miners will offer a compromse on the basis of three cents a bushel for local coal and two and a half cents for foreign trade. The operators say that the Pittsburg trade has developed the fact that the local dealers can pay three cents, but that the trade will be very small as soon as the warm weather comes.

The Hocking Valley Relief Committee has issued an appeal to the people at large, asking them to continue to forward assistance, as the miners of Shawnee and New Straitsville, Ohio, will be unable to secure employment for several weeks yet.

The strike of the laborers on slope No. 1 of the Susquehanna Coal Company's mines at Nanticoke, Pa., has ended. The leaders were discharged.

The shop of the Troy Malleable Iron Company, at Troy, New York, which the Iron Molders' Union No. 2, of that city, has refused to countenance for the last two years, was declared open to union molders by the Union, March 20th. It is estimated that, at the time of the strike at the works, the Union paid from $3000 to $5000 outright to carry on the battle, and was aided by unions all through the country, probably $25,000 being spent in the struggle. The proprietors of the works refused to make any concession, and the Union was almost wrecked in the contest, and is finally compelled to yield.

Agitation in favor of the eight-hour system is becoming general in Canada.

In the lower house of the Ohio Legislature, a child labor bill was passed on March 24th. As amended, it limits the age at which children may work in factories and mines to twelve years.

## RAILROAD NEWS.

A verdict in the case of William A. Brydon *vs.* the Baltimore & Ohio Railroad Company, in a suit for damages for violation of contract, was found at Baltimore March 20th. The contract was for the delivery of 150 tons of coal a day for three years, which the railroad company repudiated after a few weeks. The verdict is for the plaintiff for $75,000. The case will be appealed.

The protracted and obstinate conflict between the

Philadelphia & Reading and the Reading & Pottsville railroad companies, involving the proposed route of the latter road in its approach to and passage through Pottsville, Pa., has been amicably adjusted.

The annual election for directors of the Pennsylvania Railroad Company to serve during the coming year resulted in the re-election of the old Board, as follows: George B. Roberts, Wistar Morris, Alexander M. Fox, Alexander Biddle, N. Parker Shortridge, D. B. Cummins, Henry D. Welsh, John Price Wetherill, William L. Elkins, William Thard, H. H. Houston, A. J. Cassatt, and C. A. Griscom.

A dispatch dated Tucson, Arizona, March 25th, says that the announcement was made yesterday that the forfeited lands of the Texas Pacific Railroad were open to entry. This caused a great rush in the United States Land-Office, and the officers had all they could do to make the entries. Thousands of acres will be reclaimed.

The statement of the business of all lines of the Pennsylvania Railroad Company east of Pittsburg and Erie for February, 1885, as compared with the same month of 1884, shows a decrease in gross earnings of $351,033; a decrease in expenses of $56,943; a decrease in net earnings of $294,090. The two months of 1885, as compared with the same period of 1884, show a decrease in gross earnings of $647,744; a decrease in expenses of $178,093; a decrease in net earnings of $469,651. All lines west of Pittsburg and Erie for the two months of 1885 show a deficiency in meeting all liabilities of $264,200, being a decrease as compared with the same period of 1884 of $7929.

## COAL TRADE NOTES.

### ALABAMA.

Twelve coke-ovens for coking the screenings are erecting at the mines of the Cahaba Coal and Coke Company, at Helena.

### CANADA.

#### PROVINCE OF NOVA SCOTIA.

Reports from Sydney, Cape Breton, state that the fire in the mine there, which has been burning for some time, has been extinguished, and the work of raising coal resumed.

### MARYLAND.

Beverly S. Randolph has been appointed mining superintendent of the Consolidation Coal Company, at Cumberland, to succeed the late James B. Thomas.

### MEXICO.

Professor L. M. Norton, of the Massachusetts Institute of Technology, has analyzed the surface specimens of the coal recently discovered at Jimulco, on the line of the Mexican Central Railroad. He says it is "a coal of rather poor quality, but available for fuel. Its heating power is between one third and one half of that of Pennsylvania anthracite. It is impossible to speak with certainty, but it is likely that the surface coal is less valuable than that which lies below. In my opinion, the vein should be opened and the coal subjected to further analysis and to practical tests."

### OHIO.

At Chapman, all the mines are running steadily at the reduction.

Augustin Converse has been appointed receiver of the Buckeye Creek Coal and Iron Company.

### PENNSYLVANIA.

#### ANTHRACITE.

Work was resumed at the Ebervale, on March 24th.

At the various mines of A. Pardee & Co., including many other collieries in the Hazleton region, the quota for March has been filled, and the operators on March 23d issued a notice that there would be no more coal mined this month.

The Lehigh Valley Coal Company's new shaft in Exeter borough has attained a depth of 400 feet out of the 650 feet expected to reach the red ash seam. A new air-shaft will be put down in connection with this opening, and the colliery will be operated independently of others contiguously located belonging to the same corporation.

One thousand acres of coal lands are to be sold at sheriff's sale in Lackawanna County, April 4th, on a $500,000 execution, in satisfaction of a judgment of the Scranton Trust Company and Savings Bank, trustee, against the Lackawanna & Susquehanna Coal Company. There are two breakers and the other necessary buildings and machinery on the property.

The Hillman Vein Coal Company has begun to put down a new air-shaft on the Bennett farm near the main opening. The breaker is also to be enlarged during the coming summer.

The collapse of the Union Coal Company, of Scranton, with liabilities $65,000, is reported. The sheriff has levied upon the stock of goods at the company's store at Green Ridge, upon mules, mine supplies, and the interest of the association in the machinery.

#### BITUMINOUS.

Sealed proposals will be received at the office of the Camden Water Department, at Philadelphia, until half-past seven P.M., March 30th, 1885, for three hundred tons of Clearfield bituminous coal, of 2240 pounds per ton, free from dirt and slate, to be delivered along the wharf at Water-Works, Pavonia, on or before April 10th.

#### COKE.

March 25th, at a meeting of the Coke Syndicate, it was decided to advance the price of coke to $1.20 a ton on April 1st. The present rate is $1.10. About 200 furnaces and 1000 foundries will be affected.

The final meeting of the year of the Coke Producers' Association was held March 20th, at Pittsburg. President Boyle declined a re-election, and Mr. D. A. Dillinger was elected in his place. Col. J. M. Reed was re-elected Secretary, and Mr. J. R. Stauffer Treasurer. It was decided to meet hereafter at Mr. Everson's office, Scottdale. It was announced that trade was slightly duller than at last report. There are now 70 per cent of the ovens in operation, against 55 last month. It was understood that an advance in price to $1.25 would be made after April 1st. The shipments last month were announced to be 7000 cars, an increase of 20 per cent. Checks from the syndicate for nearly $125,000 were received. In the evening, the Association celebrated its first anniversary with a banquet.

## GAS AND PETROLEUM NOTES.

The exports of refined, crude, and naphtha, from all United States ports from January 1st to March 7th, for the years 1884, 1885, were as follows:

| | 1885. Gallons. | 1884. Gallons. |
|---|---|---|
| From New York | 61,512,379 | 60,423,590 |
| Boston | 1,043,709 | 1,164,326 |
| Philadelphia | 11,889,171 | 9,441,610 |
| Baltimore | 1,854,356 | 786,357 |
| Richmond | ..... | ..... |
| Total exports from United States, | 76,299,615 | 71,815,883 |

### PENNSYLVANIA.

#### NATURAL GAS.

An explosion of natural gas at Beaver Falls, Pa., March 24th, completely demolished a two-story frame house.

Natural gas will be introduced into the heating-furnaces at Hussey, Howe & Co.'s works, at Pittsburg.

At the mills of Shoenberger & Co. and Brown & Co., at Pittsburg, natural gas is in course of introduction in those departments where it has not already been adopted.

At A. & D. H. Chambers's glass factory, at McKeesport, Pa., natural gas will be introduced as fuel.

Tibby Brothers, Sharpsburg, Pa., are using natural gas in their works.

The Special Committee of Councils, appointed shortly after the Lawrenceville explosion, to examine into the natural gas problem, in all its phases, have reported to the councils the result of their investigations. The ordinance submitted with the report contains ten provisions. It provides for filing plans with the city engineer of the character and extent of all lines before the streets are opened. All pipes to be thoroughly tested, and the maximum pressure not to exceed eight pounds to the square inch. In case of leakage or over-pressure, the city engineer is authorized to cut off the supply until the matter is rectified. Troublesome valves and the testing of the pipe after they are laid are provided for. Lastly, it is provided that no street or part of street shall be opened without the consent of the city engineer.

## GENERAL MINING NEWS.

### ARIZONA.

#### GRAHAM COUNTY.

ARIZONA COPPER COMPANY.—For the week ended March 7th, 115,749 pounds of black copper were shipped. At a recent meeting of the company in London, the question of increasing the output was discussed. It is asserted that the company can make money at the present price of copper, working the rich ore,

### CALIFORNIA.

#### MONO COUNTY—BODIE DISTRICT.

BODIE CONSOLIDATED.—Since the mill started, 256 tons of ore have been crushed, from which 500 pounds of amalgam have been received. This will be retorted and forwarded to San Francisco. Thirty-seven men are employed.

CONSOLIDATED PACIFIC.—Since the last report, the drift on Pacific ledge No. 1 has been advanced 6 feet through very hard rock. The change in the formation has been great within the last few feet, the ground being almost filled with quartz in stringers and bunches mixed with porphyry. The indications are fair. In the cross-cut, they are still at short intervals cutting excellent looking stringers of quartz, but have not yet cut Pacific ledge No. 2.

MONO.—Some good ore has been found in the winze started 120 feet south of the Bodie line.

STANDARD CONSOLIDATED.—The stopes are looking well. There were crushed 498 tons of ore and received 490 ounces of crude bullion. There are employed 41 miners, 4 carmen, 4 station-tenders, 2 laborers, 1 blacksmith-helper at $4; 2 engineers, 1 pump-man, 1 blacksmith, 1 shift-boss at $5 a day, and 1 foreman at $200 a month.

#### SAN BERNARDINO COUNTY.

BONANZA KING.—It is reported that the company has shut down the mines and mill.

### CANADA.

#### PROVINCE OF NOVA SCOTIA.

HALL-ANDERSON.—Official: The recent strike at this mine proves to be of great value. It occurred in the Orion lead, at about 80 feet below the surface. Some 200 feet have been stripped on the vein about 2 feet wide, but none of the ore will be milled until the new steam hoisting-works (now all on the ground) are in running order, which will be some time in April. Forty miners are employed. The new management at the mine has taken hold with an energy that promises rich returns in the near future for its large outlay. The Nova Scotia Parliament has promised an appropriation to complete the road into the mine this spring.

OXFORD.—On January 1st, the company attempted to reduce wages at its mine ten per cent; but owing to the great demand for miners at the newly opened mines, the attempt was a failure, and the men all struck and left. Consequently for two months the works were closed down. About the middle of this month, however, a new force has been obtained and every thing is now rushing. During the continuance of the strike, the plates were scraped and $3550 in gold taken from them. The superintendent telegraphs on the 21st inst.: Will have mill and every available place filled with ore before plates are ready. Full force of miners at work. Vein improving in width and quality.

### COLORADO.

#### CLEAR CREEK COUNTY.

Matthews & Webb, of Denver, have begun the foundation of their concentrating-works at Idaho Springs.

#### GUNNISON COUNTY.

JUMBO MINING, SMELTING, AND LAND COMPANY.—The incorporators are Elliot R. Moffet, Sr., Oliver R. Moffet, John L. Moffet, and Elliot R. Moffet, Jr. The capital stock is $200,000. The principal business of the company will be carried on in Gunnison County, and the principal office will be kept at the company's works at Gunnison.

#### HINSDALE COUNTY.

OCEAN WAVE.—The interest of the Ocean Wave Mining and Smelting Company in the Ocean Wave and Wave of the Ocean mines, and a number of lots in Lake City, has been sold by the sheriff, to satisfy a judgment for $2619. On the lots, was the Ocean Wave mill, a tax deed of which was given to John Maugham a year ago, and which was later transformed into a concentrator by the Argenta Falls Company. The property was all purchased by Mr. Jones, of Kansas City, a representative of the Mastin interest, for $2650. The Mastins have held a controlling interest in the mines, and the property was put to a sale merely to try and clear the title. The fight will now be between the Mastins and John Maugham, and in all probability it will be fought hard and to a finish.

#### LAKE COUNTY.

AMIE.—The lease on the Amie No. 5 shaft, on Fryer Hill, is producing some fine ore.

MORNING AND EVENING STAR.—An increased force has been put on the main workings. The portions of the property under lease are producing considerable good grade ore,

NEW PITTSBURG.—Messrs. Edward Cane and others, working a lease on this property from the Stonewall Jackson shaft, have discovered a body of heavy galena ore.

PARK COUNTY.

GREAT WEST.—Injunctions have been served at the Great West mine restraining those in possession from disposing of any ore produced from that property. Injunctions were also served at the same time on the Boston & Colorado Smelting Company, the Alma Sampler, and the First National Bank of Denver, restraining them from purchasing any ore from the Great West, or paying any money for such ore.

SOVEREIGN.—The company is making extensive preparations for the spring work. During the week, the force on the First National has been more than doubled, and the number has also been doubled on the Columbia. The work done by this company is still in the line of development. It has not yet been decided whether or not the mill will be built on the site of the old Pioneer mill, but probably it will be located nearer the creek.

PITKIN COUNTY.

EMMA.—A suit has been brought by Emma Moody to recover a one-sixth interest in this mine, at Aspen. It is claimed that this interest was deeded to the plaintiff on the seventeenth day of May, 1881, by Almira B. Wood, the widow of William J. Wood, who was one of the locators of the mine. The complaint avers that the plaintiff was ousted from the possession and enjoyment of her interest and rights on the first of March, 1884, and that possession has since been denied her. She prays for restitution of the interest, for $10,000 damages, and for $100,000 for her share of the proceeds of the property. Mr. Holden, the receiver, has arrived in Aspen and has taken charge of the Emma mine. Ore-shipments are made.

SAN JUAN COUNTY.

SAMPSON.—The mill is running to its full capacity. The cost of running the entire workings, including mine, mill, boarding-houses, tramways, etc., for the past month was $2074.60, and the gross receipts for the same time were $4576. A great deal of development-work was done on the drifts to open more stoping ground.

## DAKOTA.

The bill for the establishment of a school of mines at Rapid City has passed both branches of the Legislature and received the signature of Governor Pierce.

GOLDEN SUMMIT.—The machinery of the Cross mill has been moved to its new site about 100 yards from the shaft of the Golden Summit mine. It is expected that operations will begin about May 1st. The ore encountered in the cross-cut at a depth of 130 feet returns good prospects in the pan. There is a considerable quantity of sulphurets in the ore, and assays indicate that these are rich in gold. A force will soon begin the work of running drifts from the shaft to make an ore supply available. Hoisting-works of improved pattern will be introduced.

## GEORGIA.

ETOWAH.—This manufacturing and mining company recently sold its mining land and water-power to a Rome company for $100,000.

## IDAHO.

Messrs. Smith Brothers & Watson, owners of the Watson Iron-Works of Portland, Oregon, contemplate the starting of reduction-works at Hailey, and will soon visit that place with the view of ascertaining the quantity and quality of ore to be had, and what arrangements can be made with mine-owners.

PHILADELPHIA MINING AND SMELTING COMPANY.—Superintendent Moulton is at the Eastern, office to consult and advise with the stockholders of the company regarding future operations. The business done at the smelting and roasting plant at Ketchum, last year, though on a comparatively limited scale, is said to have been in the main satisfactory as to profits. The question of erecting smelting and refining-furnaces at Hailey is also to be discussed, and a proposition is to be made to the Little Wood River Mining and Smelting Company to remove to Hailey its furnaces now at Muldoon.

QUEEN OF THE HILLS.—At the works, the original force of fifty men has been put to work again and the mill started up. The company has closed a contract with the Omaha & Grant Works at Denver, by which that concern takes the total output for 1885, the ore and concentrates being shipped by the Union Pacific.

## MICHIGAN.

IRON MINES.

DETROIT.—The mine has made a remarkable improvement within the last four months. A diamond drill was kept in operation for some months, at a great expense, the formation here being badly broken up and difficult of drilling, but it paid for the money spent by the management as it revealed a fine ore-body. The main shaft is down 315 feet, from which a cross-cut some 59 feet in length was driven to the vein. There has been a level run into the body of ore, west, a distance of 140 feet, and cross-cuts north and south 40 feet, without finding foot or hanging-walls. The ore is excellent in quality, yielding 63 per cent metallic iron. The owners operate their own blast-furnaces, and can use all the ore that the mine will produce.

## MONTANA.

BEAVERHEAD COUNTY.

HECLA CONSOLIDATED.—The production for February was as follows: 396,675 pounds of lead, 11,174 pounds of copper, 45,474·66 ounces of silver, and 23½ ounces of gold.

SILVER BOW COUNTY.

ALICE.—The secretary reports: The product of our mills for February, $62,435.83, is small on account of having to shut down from ten to twelve days incident to the change from steam-pumps placed inside the mine to a 12-inch Cornish pump, which is built after the most approved pattern by Fraser & Chalmers, of Chicago. This change will result in a large saving to the company in the consumption of fuel.

AMY SILVERSMITH.—The shaft is 100 feet deep, but will be pushed to a depth of 200 feet, perpendicular, from whence a cross-cut will be run to intersect with the main vein.

ANSELMO.—The mine is actively worked by Hauswirth Brothers & Co., who are taking out considerable ore, which samples $45 from the south vein at a depth of 60 feet.

KENTUCKY.—The property has been bonded to Butte parties for $8000. A shaft 150 feet in depth was sunk on the vein one year ago, when operations ceased on account of a disagreement among the owners. The lead is about 14 feet in width with a pay-streak three feet wide. The ore carries bismuth, antimony, and sulphurets of silver.

LEXINGTON.—On and after April 1st, the company will be prepared to buy milling ores, and do custom work generally at current rates.

MARGARET ANN.—The shaft has reached a depth of 200 feet. Stations will be put in at the 200-foot levels, and from this point levels will be run east and west. The south cross-cut has been already started, and it is expected that the main vein will be struck soon.

MARIA.—The company is about to lease the adjoining property on the west, and will at once furnish the works necessary for actual development.

NATIONAL.—Henry Williams, of the Colorado Smelter, has purchased, it is said, an interest in this mine. The work of development is to be resumed. The mine has been idle for one year. The main shaft is 300 feet deep.

NEPTUNE.—Stoping is going on from both levels, and from 250 to 300 tons a month of 60-ounce ore are hoisted and sent to the Colorado Smelter.

## NEVADA.

ESMERALDA COUNTY.

MOUNT DIABLO.—The amount of bullion produced from February 1st to March 15th, inclusive, is $49,382.15.

EUREKA COUNTY.

EUREKA CONSOLIDATED.—The works will be fired up April 5th. The mine looks well, and good ore is extracted from four or five of the different levels.

STOREY COUNTY—COMSTOCK LODE.

The hydraulic pumps at the Combination shaft work smoothly and hold the water at the 3000 level. They raise 3,700,000 every twenty-four hours to the Sutro Tunnel level, and are only running at about two thirds of their capacity. The water raised to the surface by the pumping machinery, at the north end, when running at the greatest capacity, was only 1,250,000 gallons every twenty-four hours. If necessary, the powerful hydraulics at the Combination could handle this amount in addition to the water they are now lifting.

CONSOLIDATED CALIFORNIA & VIRGINIA.—There were reduced at the Eureka mill within the last month 1407 tons and 850 pounds of ore, which yielded bullion of the assay value of $27,411.49; net value, $24,578.37.

## NEW JERSEY.

DICKERSON.—A serious cave has occurred at this old mine on Mine Hill. The location of the fall was in the main shaft, where another serious cave occurred some years ago. It is said that it will take at least six weeks to clear the obstructions. The new shaft will be ready for operations about June 1st.

## NEW MEXICO.

BERNALILLO COUNTY.

The smelter to be erected at Albuquerque, as planned, is said to be a branch of the Grant Smelter at Denver. Ex-Governor Grant is expected to arrive and determine the question, It is reported that generous concessions have been made by the people of Albuquerque, and the Atchison, Topeka & Santa Fé roads are fostering the scheme.

GRANT COUNTY.

The new smelter at Silver City has been in successful operation for three weeks. Ores have begun to come in from the mines about. The company is prepared to buy all kinds of ores, except lead ores, in any quantity from a burro load up. It will crush and sample any ore brought, give one sample to the customer, use one itself, and keep a third sealed for reference.

PINOS ALTOS.—The mill has begun to run on ore from Dr. Bailey's gold mines at Piños Altos. Five hundred tons will be put through.

## NEW YORK.

Investigations on lands of the Buffalo Cement Company at Buffalo Plains have, according to press dispatches, revealed the existence of a stratum underlying the soil that is considered of great value for building and other purposes. A shaft was sunk, and at 12 feet below the surface an excellent quality of cement material was found. Below this material and for 70 feet, the shafting went through ordinary building-stone of superior quality, and at the depth indicated a bed of pure gypsum was found, as white as snow, and said to be equal to the best of that imported from Europe and Nova Scotia. The bed is 37 feet in thickness. A stock company, some of the members of which are already interested in other cement works and quarries is about forming, articles of incorporation are drawn, and the work of excavating will be begun at once.

The vein of salt that was discovered near Clifton Springs last week, and to which reference was made in our last issue, is said to be much more valuable than was at first supposed. The well has been sunk twenty feet farther into the ground, and is now 685 feet deep. The vein is twenty-eight feet thick. To the depth of 635 feet, the formations are said to be the same as at Syracuse and at Liverpool, New York. In the last two days, great quantities of brine have been pumped from the well and numerous experiments have been made with it. A pint of brine yields five ounces of salt of a fine quality, and there seems to be no limit to the supply of brine.

## UTAH.

JUAB AND UTAH COUNTIES.

UTAH VALLEY IRON MINING AND MANUFACTURING COMPANY.—Articles of incorporation have been filed by this company which is to exist for fifty years, and is stocked for $100,000 in 20,000 shares at $5 per share, par value. The officers are as follows: A. D. Holdaway is President; J. S. Page, Vice-President; A. A. Noon, Superintendent. The objects are, to buy, sell, own, operate, and develop certain iron mines in Tintic Mining District, on the east side of the Tintic range. Also to own and operate machinery, etc., for the manufacture of iron in all its branches. The iron mines have been worked to some extent, and can be easily developed There is talk of building a railroad from the mines to Provo, where furnaces, foundries, etc., will be started up. The distance would be less than 35 miles.

SALT LAKE COUNTY.

FLAGSTAFF.—It is said that the mine is to be worked again.

MAMMOTH.—A strike is reported to have been made n this mine at Bingham.

## ORE MARKETS.

CLEVELAND.

Reports from Cleveland state that leading foundry men say that as yet they are doing very little. They are keeping up the needs of each day, and see no signs of an immediate revival. There has been during the week ended March 22d, a little more activity in the ore line. Buyers have no trouble in placing their orders, and there is a large stock still on the docks. Considerable ore has been already sold for the next season in

2000, 3000, and 5000 ton lots. The long and severe winter is expected to make a strong demand for railroad iron, as there will be a great deal of repairing needed. Of lake freights, it is said that there are vessels offering ore contracts to September or October at 95 cents, or for the whole season at $1.05. Chartering so far has been quite light, and it is thought that single trip contracts will be the season's rule.

No. 1 specular and magnetic Bessemer ores, a ton, $5.75.

No. 1 specular (non-Bessemer) ores, a ton, $5.

Bessemer hematites, $4.25@$5.

Non-Bessemer hematites, $3.75@$4.

Lake freights between Marquette and Cleveland will rule at $1.15 and under this year, and 45 cents a ton from Ishpeming to Marquette. From Two Harbors, the shipping port for Vermilion ore, the rate will be $1.25.

CHATTANOOGA, TENN.

Fifty per cent red fossil a ton, $1.60@$1.85 Brown hematite, $2.25@$2.50, delivered at furnace.

DENVER, COLO.

For the silver and gold in ores, from 90 to 95 per cent of the New York quotation (gold being counted at $20 an ounce).

For the lead in ores, 15 to 35 cents per unit.

For the copper in ores, from $1 to $1.30 per unit.

Smelting charges from $8 to $20.

SILVER CITY, NEW MEXICO.

From 90 to 95 per cent of the assay value for gold or silver will be paid for ores, deducting first from $12 to $17 for smelting charges. Copper will be paid for at the rate of 75 cent per unit.

## FINANCIAL.

### Mining Stocks.

NEW YORK, Friday Evening, March 27.

The anticipated improvement in the mining market does not makes its appearance, and the sales for the last few weeks have shown a decrease. This is not surprising; for the reports from all commercial quarters only tend to dampen the interest in speculative securities. The better class of stocks show the usual business and firm prices.

The announcement of a dividend of fifty cents a share by the Bodie Consolidated has created no interest in the stock. Only 200 shares changed hands at $2.35. Standard Consolidated continues strong, and shows a large increase in the dealings, going as high during the week as $1.50; the closing quotation shows $1.20, and sales of 6300 shares. Bulwer Consolidated has also received considerable attention, 4466 shares changing hands at from 37@50c., closing at 40c. Consolidated Pacific has continued its downward course; it opened at 85c. and closed at 65c., with sales of 3600 shares. There is no change to note in Plymouth Consolidated, which remains firm at from $16.25@$16.63, with sales of 1100 shares. A lot of 1000 shares of Gold Stripe was sold at 4c. Quicksilver Common has been higher; 150 shares sold at from $3.75@$4.

The Colorado stocks have been dull, the sales have been small, and the prices have varied but little. Iron Silver sold at $1.10, with sales of only 400 shares. The reports from the company's mines are favorable, and the last financial statement shows for February a profit of $35,477.19; cash in bank March 1st was $150,811.96. Robinson Consolidated dropped from 30c. to 10c. during the week; only 300 shares changed hands. Little Chief shows sales of 1000 shares, ranging from 23@24c. Bassick, sales of 350 shares at $3.

Horn-Silver has received considerable attention. The price fluctuated but little, and remained firm at from $2.30@$2.50; the sales have been smaller, as compared with the previous week, amounting to but 2100 shares. Twenty-five shares of Ontario were sold at $17.38.

Homestake records sales of 127 shares at from $10.25@$10.75. Caledonia had a business of 400 shares at from 85@87c.

Eureka Consolidated is steadily growing in favor; the sales have not been large, amounting only to 450 shares, but the price has been firm at from $3.90@$4.25. Albion Consolidated shows a sale of 600 shares at 10c. Considerable business is still done in Sutro Tunnel which remains steady at 13@15c; sales, 13,800 shares. Consolidated California & Virginia has been higher, selling at from 40@45c., 9400 shares changing hands. One hundred shares of Hale & Norcross were sold at the high figure of $6.38. Alta has been quite active, with declining prices; 1800 shares were sold; the opening quotation shows 30c., and the closing 15c. Small transactions in other Nevada stocks are also reported.

Silver King remained strong at from $3.50@$4. Alice, $1.90.

The total transactions during the week amounted to 51,393 shares, and compared with those of the preceding week, show a decrease of 5714 shares. A complete summary of the market is given elsewhere.

MEETINGS.

The annual meetings of the following companies for the election of trustees and the transaction of business will be held at the times mentioned:

Bulwer Consolidated Mining Company, Room 29, No. 309 Montgomery street, San Francisco, Cal., April 8th, at one o'clock P.M.

Cannon Iron Company, office of J. G. Heuszey, No. 216 South Fourth street, Philadelphia, Pa., April 13th, at twelve o'clock M.

Champion Iron Company, Marquette, Mich., April 20th, at three o'clock P.M. Special meeting to consider the proposition to sell the leasehold and personal property of said company, and (if a sale thereof shall have previously been made by the committee heretofore appointed for that purpose) to confirm and ratify such sale.

Franklin Mining Company, No. 19 Congress street, Rooms 11 and 12, Boston, Mass., April 15th, at twelve o'clock M.

Magnetic Iron Mining Company, office J. G. Heuszey, No. 216 South Fourth street, Philadelphia, Pa., April 8th, at twelve o'clock M.

Mineral Range Iron Mining Company, No. 9 North Canal street, Chicago, Ill., April 8th, at ten o'clock A.M.

Pelican & Dives Mining Company, No. 197 Broadway, New York City, April 7th, at two o'clock P.M.

Peru Steel and Iron Company, No. 115 Broadway, New York City, April 6th, at three o'clock P.M.

DIVIDENDS.

Bodie Consolidated Mining Company, of California, has declared a dividend (No. 19) of fifty cents a share, payable April 6th, at the office of Laidlaw & Co., 14 Wall street, New York City.

DIVIDENDS PAID BY MINING COMPANIES DURING THE MONTH OF MARCH AND FROM JANUARY 1ST, 1885.

| NAME OF COMPANY. | Location of mines. | Paid during month of March. | Since January 1st, 1885. |
|---|---|---|---|
| Adams, S. L | Colo. | $18,750 | $52,500 |
| Alice, G. S | Mont | 50,000 | 50,000 |
| Atlantic, C | Mich | | 20,000 |
| Bellevue-Idaho | Idaho | | 12,500 |
| Big Bend Hydraulic, G | Cal. | 6,000 | 18,000 |
| Bonanza King, G | Cal | | 10,000 |
| Colorado Central, S | Colo | 15,000 | 15,000 |
| Father de Smet, G | Dak. | 20,000 | 60,000 |
| Hecla Cons., G. S. L. C | Mont. | 15,000 | 45,000 |
| Helena, G. S. L. C | Mont. | | 36,000 |
| Homestake, G | Dak. | 31,250 | 93,750 |
| Honorine, S | Utah | | 12,500 |
| Jocuistita, S | Mex. | | 50,000 |
| Little Chief, S. L | Colo. | 20,000 | 20,000 |
| Moulton, S | Mont. | | 30,000 |
| Navajo, S. L | Nev. | | 50,000 |
| Ontario, S | Utah | 75,000 | 225,000 |
| Oro Grande, G | Cal | | 15,000 |
| Plymouth Con., G | Cal | 50,000 | 150,000 |
| Queen of the Hills | Idaho | | 12,500 |
| Quincy, C | Mich. | | 100,000 |
| Rooks, G | Vt. | | 15,000 |
| Silver King, S | Ariz. | | 50,000 |
| Small Hopes Con., S. L | Colo. | 37,500 | 187,500 |
| | | $338,500 | $1,330,250 |

S., Silver; L., Lead; G., Gold; C., Copper.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows on the oil market for the past week:

There have been wide fluctuations in the market during this period, and trading has been quite heavy. Opening last Saturday at 81c., it sold down to 79⅛c., closing at 81c. The highest price Monday was 82¼c. and the lowest 80⅝c. Tuesday, the market sold up to 84c. Wednesday and Thursday, prices were between 80¾c. and 84c.; and to-day, the market, after selling down to 81c., sold up to 82½c. bid, at which it closed strong. There is no special change in the field situation, which is generally conceded to be bullish. The shipments from the region continue in excess of the receipts there, and this reduction of stocks has been going on for some time. The Eastern extension of Thorn Creek is practically cut off, and until some new field is discovered, it is likely that the production will gradually decline.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

| | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---|---|---|---|---|---|
| March 21 | $0.81 | $0.81 | $0.79⅞ | $0.81 | 2,388,000 |
| 23 | .81⅛ | .82¼ | .80⅝ | .82¼ | 3,337,000 |
| 24 | .82¼ | .84 | .81⅞ | .83¾ | 5,352,000 |
| 25 | .83¼ | .84 | .82 | .82¼ | 4,575,000 |
| 26 | .82½ | .83¾ | .80¾ | .82⅝ | 5,818,000 |
| 27 | .82⅝ | .82¾ | .80⅞ | .82½ | 5,654,000 |
| Total sales | | | | | 27,124,000 |

SAN FRANCISCO MINING STOCK QUOTATIONS.

*Daily Range of Prices for the Week.*

| NAME OF COMPANY. | CLOSING QUOTATIONS. March 20. | March 21. | March 23. | March 24. | March 25. | March 26. |
|---|---|---|---|---|---|---|
| Albion | | | | | | |
| Alpha | | | | | | |
| Alta | .25 | .15 | .15 | | | |
| Argenta | | | | | | |
| Bechtel | | | | | | |
| Belcher | .75 | .75 | .80 | .75 | | |
| Belle Isle | | | | | | |
| Best & Belcher | 1.00 | .90 | .90 | .95 | .95 | 1.12½ |
| Bodie | 2.25 | 2.25 | 2.25 | 1.87½ | 2.25 | 2.25 |
| Bullion | | | | | | |
| Bulwer | | | | | | |
| Challar | 1.62½ | 1.62½ | 1.75 | 2.00 | 2.00 | 2.12½ |
| Con. Pacific | | | | | | |
| Con. Cal & Va | .40 | .35 | .35 | .40 | .40 | .45 |
| Crown Point | .80 | .80 | .75 | .75 | .75 | .80 |
| Day | | | | | | |
| Elko Cons | | | | | | |
| Eureka Cons | | | | 4.50 | | 4.00 |
| Exchequer | | | | | | |
| Gould & Curry | .80 | .70 | .70 | .75 | .80 | .80 |
| Grand Prize | | | | | | |
| Hale & Norcross | 4.75 | 4.50 | 5.00 | 5.50 | 5.37½ | 5.87½ |
| Independence | | | | | | |
| Martin White | .45 | .50 | | .60 | .65 | .55 |
| Mexican | .25 | | .20 | | .15 | .20 |
| Mono | | | | | | |
| Mount Diablo | | | | | 3.87½ | |
| Navajo | 1.00 | | | 1.12½ | 1.12½ | 1.00 |
| Northern Belle | | | | | | |
| North Belle Isle | | | | | | |
| Ophir | .10 | .55 | .55 | .55 | .60 | .60 |
| Overman | | | | | | |
| Potosi | .70 | .70 | .80 | .80 | .85 | .85 |
| Savage | 1.87½ | 1.62½ | 2.00 | 2.00 | 2.00 | 2.25 |
| Scorpion | | | | | | |
| Sierra Nevada | .20 | .45 | .45 | .45 | .45 | .50 |
| Silver King | | | | | | |
| Tip-Top | | | | | | |
| Union Cons | .40 | .45 | .45 | .45 | .40 | .45 |
| Utah | .55 | | | | | |
| Wales Cons | | | | | | |
| Yellow Jacket | | 1.25 | 1.37½ | 1.37½ | 1.37½ | 1.50 |

### Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, March 26.

The market for copper stocks continues to rule dull and without feature. There is, in fact, nothing doing, and the prospect is not of an encouraging nature. Buyers have every advantage as to prices. Calumet & Hecla sold off $1 from last week's price, closing at $155, and later rallied to $158 for a single share, and again declined to $156, which is the bidding price to-day. The company is making arrangements to increase the output at the mine, and hopes to make up for the decline in ingot by an increased production. We hear nothing about a dividend as being probable in the near future; the policy of the company being to pay dividends whenever the financial situation may warrant it, without regard to any specified time. Quincy has ruled steady with small sales at $29. A small lot of Franklin sold at $6. Osceola sold at $8, same as before.

In silver stocks, there is no activity or special feature. Bowman Silver is in slightly better demand, with but little disposition to sell it at present figures; sales at 13@15c. Catalpa, quiet at 20c. bid. Dunkin, at 18@20c. Consolidated Pacific had another of its fits of weakness, and sold down, in sympathy with the New York market, to 60c. The stock is entirely under manipulation, and prices are made up or down to suit.

The miscellaneous stocks are dull and no material change in prices noted.

3 P.M.—Calumet sold this afternoon at $158, and closed $158 bid, $160 asked. Osceola, $7½ bid, $8 asked. Quincy, offered at $29½, no bid. Franklin, offered at $6½. Atlantic, at $7.

## BULLION MARKET.

NEW YORK, Friday Evening, March 27.

| DATE. | London. Pence. | N. Y. Cents. | DATE. | London. Pence. | N. Y. Cents. |
|---|---|---|---|---|---|
| Mch. 21 | 49 3-16 | 107 | Mch. 25 | 49 | 106⅞ |
| 23 | 49⅛ | 107 | 26 | 49 | 106⅞ |
| 24 | 49 1-16 | 106⅞ | 27 | 49 | 106⅞ |

BULLION PRODUCTION FOR 1885.

| MINES. | States. | Month of February. | Year from Jan. 1st, 1885. |
|---|---|---|---|
| | | $ | |
| *Adams, S. L. | Colo... | 31,000 | 70,600 |
| *Alice, G. S. | Mont .. | 62,436 | 156,456 |
| *Belmont | Nev.... | —— | 10,003 |
| *Boston & Montana, G | Mont .. | 35,121 | 66,399 |
| *Christy, S | Utah .. | 18,025 | 35,941 |
| *Chrysolite, S | Colo... | 4,463 | 9,234 |
| *Colorado Central, S | Colo... | 19,141 | 36,300 |
| *Consolidated Bobtail, G | Colo... | ..... | 6,501 |
| *Deadwood-Terra, G | Dak.... | 32,687 | 80,383 |
| *Derbec Blue Gravel, G. S. | Cal .... | .... | 15,226 |
| *Essex, G. S. | N. S.... | 864 | 2,266 |
| *Eureka Consolidated, S. L. | Nev.... | ..... | 27,395 |
| *Father de Smet, G | Dak.... | 29,303 | 63,870 |
| *Grand Prize, S | Nev.... | ..... | 25,150 |
| *Granite Mountain, S | Mont... | 76,700 | 139,600 |
| *Head Center & Tranquillity | Ariz... | 24,625 | 43,448 |
| *Hecla Consolidated, G. S. L. C. | Mont... | ‡59,148 | 116,053 |
| *Helena, G. S. L. C | Mont... | 91,500 | 176,500 |
| *Homestake, G | Dak.... | 96,500 | 197,057 |
| *Hope, S | Mont... | 17,600 | 23,500 |
| *Iron Silver, S. L. | Colo... | 67,038 | 129,083 |
| *Kentuck, S | Nev.... | 357 | 357 |
| *Lexington, G. S. | Mont... | 51,118 | 112,301 |
| *Moulton, S. G. | Mont... | 64,203 | 121,915 |
| *Mount Diablo, S | Nev.... | 26,924 | 26,924 |
| *Navajo, S | Nev.... | 25,632 | 82,894 |
| *New Pittsburg, S | Colo... | 1,829 | 9,594 |
| *North Belle Isle, S | Nev.... | 2,118 | 2,118 |
| *Ontario, S | Utah... | 166,703 | 366,372 |
| *Oxford, G | N. S.... | —— | 987 |
| *Plymouth Consolidated, G | Cal ... | 80,975 | 166,697 |
| *Rooks, G | Vt..... | 7,092 | 14,201 |
| *South Yuba, G | Cal .... | —— | 400 |
| *Standard Consolidated, G | Cal ... | †33,600 | 58,399 |
| *Stormont, S | Utah... | 13,129 | 25,679 |
| *Tombstone, G. S. L. | Ariz ... | ‡59,002 | 107,106 |
| | | ..... | 2,526,909 |

*Official. G., gold; S., silver; L., lead; C., copper. Silver valued by the different companies from $1@$1.29·29 per ounce; gold, $20.67. †Net. ‡Not including value of lead and copper. —— No shipments during month mentioned.

*Foreign Bank Statements.*—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 3½ per cent. During the week, the bank gained £128,395 bullion; and the proportion of its reserve to its liabilities was reduced from 49 to 48, against 47 3/16 per cent at this date last year. March 26th, the bank gained £117,000 bullion on balance. The weekly statement of the Bank of France shows a gain of 2,952,000 francs gold and a gain of 6,672,000 francs silver. The Imperial Bank of Germany gained 2,280,000 marks in bullion during the week.

## METALS.

NEW YORK, Friday Evening, March 27.

The election of officers of the New York Metal Exchange will take place March 30th. Polls open from eleven A.M. to two P.M.

**Copper.**—The end is not yet, and Chili Bars, the capricious basis on which our copper market chooses to base itself, have found a lower level than ever. Cables both yesterday and to-day quote £45 as the price, and the market "dull." Best Selected, £50 10s. Our manufacturers here get their Lake copper under the pool arrangement at 10·10 cents per pound, while in the open market the price has declined for Lake copper to 10½ cents, at which figure 260,000 pounds were sold during the week.

Baltimore was sold to some extent at 10·15c., and is still offered at that price, while 10c. is offered.

The demands for consumption are light, and though from present indications there is little chance for an increase in price, most of the large producers continue to run. The Anaconda is reported to have made another sale abroad of 6000 tons of matte (about 60 per cent), making, say 7,000,000 pounds of copper, deliveries to run over five months. The price is not stated, but it is said to be based on Chili Bars and not on Best Selected, as was done in the previous sale (another and high authority not so specific in statement gives the quantity as 4000 tons, and the basis Best Selected. It certainly appears strange that large contracts for future delivery should be made while the copper market is in the present condition and at prices that can leave scarcely enough to pay expenses, the companies exhausting their mines to no purpose. The present price of Montana matte would be equivalent to about 8¼ cents per pound of copper here, and it is certain that, as long as the smelters can buy matte at a figure that will leave them a profit on the refining, they will continue to make and sell. It has been suggested that there would be more money made by controlling the stocks in England for six months and stopping the mines here than there will be in two years of running them on the present margins. Large sales of Rio Tinto Regulus have been reported at 8s. 3d. per unit, a price that must be near the cost of even that great Spanish mine.

Shipments of Lake copper are likely to be heavy for some time. Some 3,000,000 pounds of Calumet & Hecla were received here, mostly for foreign shipment during the present month.

**Lead.**—The market here is dull, and the small transactions reported have been at a slight concession from last week's figures. We quote 3·60@3·70c. nominal. Foreign is quoted at 4·30@4·52½c. Cables quote Soft Spanish in London at £10 10s., an advance of 10s. within the week.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

The market is a little easier. The absence of buyers is effecting a decline. Business has been quiet and of a limited character, with quotations at 3·50@3·45c.

**Tin.**—There has been a fair business in this article.

The following sales have been posted at the Metal Exchange:

Sales March 21st, 10 tons, March, ·1750; March 23d, 10 tons, March, ·1745; March 23d, 10 tons spot, ·1735; March 23d, 10 tons, March, ·1735; March 23d, 10 tons, March, ·1730; March 25th, 20 tons, May, ·1730; March 26th, 10 tons, April, ·1730; March 26th, 20 tons, May, ·1720; March 27th, 10 tons, March, ·1740; March 27th, 10 tons, April, ·1725.

A cable reports the Banca sale as having gone off at 48⅛ guilders; the preceding sale, 48½.

**Spelter.**—Nothing is doing worthy of note. Prices, 4·35c., nominal, for Domestic; Silesian, 4·70@4·75c.

## IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 27.

**American Pig.**—The condition of the pig-iron market is still at the low point we have recorded, for months past; indeed, if any thing, prices are weaker in some kinds, though such concerns as the Thomas Iron Company report an active business and prices firm at $18 for No. 1 Foundry; $17 for No. 2 Foundry; $16 for Gray Forge; with No. 1 sold ahead to a degree that makes the company very independent in the matter of accepting orders. The company will blow in a seventh furnace to take the place of one blown out for repairs last week. The make is now at the rate of about 130,000 tons a year. Other brands of iron can be purchased at a small increase from these prices. The furnaces are getting concessions from last year's prices of coal and ore, and there may thus be a possibility of lowering the cost at a sufficient number of furnaces to affect the selling price.

**Scotch Pig.**—This continues steady at unchanged prices, varying from $21@$21.50 for Coltness to $18 for Eglinton; 1000 tons have arrived during the week, the greater part of it yesterday, and through freights are somewhat higher—50c. to 60c.—owing to the considerable quantity of potatoes (some 2500 sacks) that are coming over, and that pay higher freights than iron. Most of this iron is sold before arrival; but the business is confined to a petty trade of from 5 to 50-ton lots, the iron being used to mix with American brands of either anthracite or Southern make.

Cable advices to-day quote prices from 53s. 6d. for Coltness to 42s. 6d. for Eglinton; Scotch Warrants, 41s. 5d.

**Steel Rails.**—These appear to go from bad to worse. It is said that they have been sold at at $25.50 a ton at Eastern mills, and it is certain that a figure below $26 failed to take the orders for several thousand tons sold here within the past two weeks. It is stated by the officers of at least one of the steel mills that, at the present price, the mills are losing over two dollars a ton on every ton sold, and it certainly seems strange that prudent business men should take contracts with deliveries running over many months at figures on which there is a loss now and no prospect of profit in the future. The present prices are certainly low enough to draw out every order that can be given; but unfortunately the roads have not the means to buy for much needed repairs.

### Philadelphia. March 27.

[From our Special Correspondent.]

The iron trade in Eastern Pennsylvania is likely to be strengthened by a better demand. Makers of pig-iron are looking for a good deal of business, but in a general way prices remain about as they were a month ago. Some few buyers of special brands have paid 50 cents more this week than a month ago. Ordinary brands are under better inquiry, but the sales are small. Inquiries for a few large lots have been made, and buyers will likely come to makers' terms. The average price for No. 1 is $18; No. 2, $16.50; Gray Forge, $15.50@$16. Brokers are trying to crowd inferior irons on to the market, but are not willing to shade prices enough to sell. Every thing is done in a hand-to-mouth way.

*Muck-Bars.*—The very best Muck-Bars are held at $27.50@$28; common brands, $26@$27. A few hundred tons have been ordered since last week at $26.50 @$26.75.

*Foreign Irons.*—Bessemer is not selling. Prices are 50 cents too high. More favorable freight rates are looked for, and three or four thousand tons will be ordered as soon as agents can obtain better freight rates. Spiegeleisen ranges from $25@$26 for 20 per cent. It is said that there has been a good deal of business in American Bessemer. The consumers of Bessemer and Spiegeleisen have still a good deal of material on hand, and are in no great need for material and will wait until the market favors them.

*Merchant Iron.*—The local manufacturers and those representing interior mills are complaining about the irregular and trifling demand, and are tired of predicting improvement. Buyers seem to be in no haste, and sellers are impatient over the slimness of their order-books. They are not able to do any thing to stimulate demand. Every thing is at a stand-still. Common iron is as low as $1.50; Medium, $1.60@$1.70; Refined, $1.70@$1.85. The winter is over and spring is at hand, but there is not that improvement that every one expected.

*Nails.*—There is some little falling off in nail making, and at factories some little accumulation of certain sizes. Prices at stores have not varied. Car-load lots at mills have been shaded, but quotations are still kept where they have been. Western parties are seeking Eastern markets, and buyers are looking for a little drop, which naturally has the effect of lessening the demand.

*Sheet-Iron.*—One or two concerns have taken some good orders, especially for galvanized, and are working along pretty full and looking for a demand that will carry them full-time into the summer. Card rates are firm for small lots, with the usual shadings for large lots.

*Merchant Steel.*—The manufacturers of merchant steel are doing a good deal of business, but all of it in small lots, and at prices that they say barely pays to do business. The demand for tool steel and steel for agricultural purposes is quite large in the aggregate, although individual orders are small.

*Hardware.*—The leading hardware houses report an improving movement for season goods.

*Cast Pipe.*—The makers of cast pipe have just booked a few good orders for water-pipe purposes.

*Steel Rails.*—Small orders are $27.50@$28; large lots, $27.

*Old Rails.*—The past week has not been productive of much business, and prices are without any change.

*Scrap.*—All kinds of scrap are active and firmer.

### Pittsburg.

The iron market shows no improvement in prices, and if the tone be better, it is rather the reflection of hope than the result of business.

The following sales have been reported to the New York Metal Exchange:

| | | | |
|---|---|---|---|
| 300 tons | Gray Forge Native ore at | $15.25 | 4 mos. |
| 100 " | " " " " | 15.00 | cash. |
| 50 " | " " " " | 14.75 | " |
| 100 " | Mottled | 14.00 | " |
| 200 " | Gray Forge Lake ore | 15.00 | " |
| 100 " | Bessemer | 17.75 | 4 mos. |
| 100 " | Foundry, No. 1 | 17.00 | " |

**Louisville.** March 26.

[Reported by GEORGE H. HULL & Co.]

During the past week, but small sales were made. The market for pig-iron was dull. Prices for standard brands and regular grades are without change, though some cuts have been made in irregular grades of second-class brands.

We quote for cash in round lots as below :

PIG-IRON.

| | |
|---|---|
| Southern Coke, No. 1, Foundry | $16 50@ $17.50 |
| " " No. 2, " | 15.50@ 16.50 |
| Hanging Rock Coke, No. 1, Foundry | 16.00@ 17.00 |
| " " Charcoal, No. 1, Foundry. | 21.00@ 21.50 |
| Southern Charcoal, No. 1. Foundry | 18.00@ 19 00 |
| Silver Gray, different grades | 14.00@ 15.50 |
| Southern Coke, No. 1 Mill, Neutral | 13.75@ 14.25 |
| " " No. 2 " " | 13.25@ 13.50 |
| " " No. 1 " Cold-Short | 13.00@ 13.50 |
| " Charcoal, No 1, Mill | 16.00@ 17.00 |
| White and Mottled, different grades | 12.00@ 13.00 |
| Southern Car-Wheel, Standard Brands | 25.00@ 26 00 |
| " " " Other " | 20.00@ 22.00 |
| Hanging Rock, Cold-Blast | 24.00@ 25.00 |
| " " Warm-Blast | 20.00@ 21.00 |

## COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 27.

### Anthracite.

The past week has been quite an eventful one in the trade.

The Reading Railroad legal troubles threaten to come to a climax promptly. It appears to be generally believed that the New Jersey Central lease to the Reading will be dissolved ; but how that will affect the hold of the Reading on the Lehigh & Susquehanna Railroad seems to be a matter of doubt. The uncertainty about the whole matter, and as to who will get control of the Reading property if it be sold out, hangs as a cloud on the horizon of the coal trade and keeps ever before us the possibility of a storm. What would happen should the Pennsylvania Railroad, that is opposed to anthracite coal combination, get control of the Reading property ? Would it work it to its full capacity and market all it could produce, irrespective of its effect on the other companies or on prices ?

The favorable position of the Reading mines to the market, had it been utilized some years ago, would have made that company strong and have given it almost absolute control of the market. The urgency of brokers and the fatal embrace of the combination paralyzed it, and vastly increased the difficulties with which it then contended. The money that could have put it in a strong, almost impregnable position has been swallowed up in mere temporary expedients, which have now, apparently, culminated in hopeless ruin. There are some diseases that require heroic treatment, and ten years ago the ENGINEERING AND MINING JOURNAL thought the Reading should adopt it. The history of the company since that time has fully confirmed the accuracy of our diagnosis and wisdom of our advice.

The unprecedented cold of this month has depleted stocks of coal throughout the country, not, indeed, to the extent of 3,000,000 tons, as some have claimed, but to a degree that may absorb a considerable part of the production for a few months to come. It is by no means safe to assume that dealers will at once renew the stocks they have been so anxious and so fortunate as to get rid of. Consumers and dealers in every line of trade are putting the carrying of stocks on producers, and only to a very small extent will exhausted stocks be replaced. Nevertheless, the condition of the market is wholesome, and there is every prospect of a fair and possibly a large trade at fairly remunerative prices, during the present year.

The opening prices have not yet been made ; but if the trade is to be held, anthracite must, for manufacturing purposes, compete in prices with bituminous coal. Our weekly reports indicate clearly what that means, and no combination can successfully resist this dictum of nature. Prices for best anthracite may be quoted as follows :

| | |
|---|---|
| Broken and Egg | $3.20 |
| Stove | 4.00 |
| Chestnut | 3.50 |
| Pea | 2.00 |

Slightly lower figures are said to have been accepted for some qualities of stove coal.

The quota for March, 1,800,000 tons, has been exceeded. It is said that a good deal of latitude is now given the companies. Several of the sanguine managers believe that the trade will take 32,000,000 tons this year. It is too soon to make any reliable estimates on this point ; but it may be of interest to reproduce the quota agreed on for the year on the basis of 30,000,000 tons :

| | Tons. | | Tons. |
|---|---|---|---|
| January | 1,500,000 | July | 2,800,000 |
| February | 1,500,000 | August, September, October, and November, each | 2,250,000 |
| March | 1,800,000 | December | 2,100,000 |
| April | 2,400,000 | | |
| May | 2,400,000 | | |
| June | 2,500,000 | | |

The Western Anthracite Association met, March 26th, at the Gilsey House, to consider the report of the special committee, consisting of E. R. Holden, of the Delaware, Lackawanna & Western Railroad ; J. D. F. Slee, of the Pennsylvania Railroad ; J. J. Allbright, of the Delaware & Hudson ; Thomas M. Richards, of the Philadelphia & Reading ; and W. H. Sayre, of the Lehigh Valley, upon the best method for conducting the anthracite coal trade in the Western market. The plan recommended was the division of the business on an equitable allotment of percentages, but no division was made at the meeting. The matter was referred to a special committee, among which is a representative of the shippers, and this committee was instructed to prepare a plan and report it to a general meeting to be held at the Gilsey House, April 15th.

Mr. John H. Jones, official accountant, publishes the following statement of the anthracite coal tonnage for the month of February, 1885, compared with the same period last year. This statement includes the entire production of anthracite coal, excepting that consumed by employés, and for steam and heating purposes about the mines :

| | February, 1885. | February, 1884. | Difference. |
|---|---|---|---|
| Phila. & Reading RR. | 655,452 | 664,970 | D. 9,518 |
| Lehigh Valley RR. | 279,743 | 376,720 | D. 96,976 |
| Del., Lack. & West. RR. | 309,901 | 345,366 | D. 35,464 |
| Del. & Hud. Canal Co. | 167,949 | 196,113 | D. 28,164 |
| Pennsylvania RR | 220,264 | 203,432 | I. 16,832 |
| Pennsylvania Coal Co. | 91,373 | 79,273 | I. 12,098 |
| N. York, L. E. & W. RR. | 43,025 | 26,812 | I. 16,212 |
| Total | 1,767,707 | 1,892,686 | D. 124,979 |

| | For Year 1885. | For Year 1884. | Difference. |
|---|---|---|---|
| Phila. & Reading RR. | 1,257,422 | 1,346,752 | D. 89,329 |
| Lehigh Valley RR | 620,488 | 769,552 | D. 149,064 |
| Del., Lack. & West. RR. | 548,321 | 652,621 | D. 104,300 |
| Del. & Hud. Canal Co. | 332,946 | 395,825 | D. 62,879 |
| Pennsylvania RR | 428,861 | 415,756 | I. 13,108 |
| Pennsylvania Coal Co | 155,377 | 167,885 | D. 12,508 |
| N. York, L.E. & W. RR. | 66,092 | 43,867 | I. 22,225 |
| Total | 3,409,510 | 3,792,258 | D. 382,748 |

The stock of coal on hand at tide-water shipping points, February 28th, 1885, was 665,565 tons ; on January 31st, 1885, 837,104 tons ; decrease, 171,539 tons.

### Bituminous.

The event of the season has been the taking of the Grand Trunk Railroad contracts, to which we referred last week. The contracts were, it is said, for 375,000 tons—250,000 tons at Suspension and International Bridges, 55,000 tons at Detroit, 20,000 tons at Sarnia, 20,000 tons at Brockville, 30,000 tons at Portland, Me. The awards were understood to be as follows : 80,000 tons to Bell, Lewis & Yates, representing the Rochester & Pittsburg Railroad ; 130,000 tons of Daques coal to the Erie Railroad ; 40,000 tons to the Brady's Bend Mining Company.

Prices at Suspension Bridge : Lump, $2.40 ; Lump and Nut, $2.35 ; Run of Mines, $2.20 per ton of 2000 pounds. For delivery at International Bridge, prices 15 cents a ton lower, or $2.25, $2.20, and $2.05 respectively.

The 55,000 tons for Detroit and 20,000 tons Sarnia delivery were awarded to the Cleveland, Lorain & Wheeling Railroad at $2.05 at Detroit and $2.20 at Sarnia.

The 20,000 tons of coal for Brockville are to be delivered by Bell, Lewis & Yates at $3.50, duty paid. The contract for 30,000 tons, to be delivered at Portland, was taken by the Consolidation Coal Company, at $3.50 per ton. It is significantly stated that "*Clearfield coal was tendered at 16 cents per ton below this price.*"

The prices of the coal delivered at Suspension and International bridges at least were regulated strictly by the carrying companies.

The following is the interesting and instructive story, as told by one of the producers : "The prices were dictated by the railroad companies. The companies in the combination, the Rochester & Pittsburg, and the Buffalo, New York & Philadelphia, said to the prospective bidders, the producers : 'You can go in and bid, but only at the prices we have fixed. If any is awarded to you on the contracts, we will then give you our terms for transportation from the mines to the points of delivery. If you don't bid at the rates fixed by us, we will either not transport your coal at all or charge you local rates.' This is the programme actually carried out, and the railroad companies concerned have thus created a gigantic monopoly, for the mines owned by them are under their control. The parties representing the railroads were officers of the three companies named. A Board of Commissioners was appointed to fix prices at which the coal would be sold. This board was composed of Col. Ensign Bennett, of the Northwestern Coal and Iron Company ; George H. Lewis, of Bell, Lewis & Yates ; and Samuel Hines, president of the coal companies of the Erie Railroad. After a long consultation, the prices at which parties were to be permitted to bid, regardless of the quality of the coal, were fixed as follows :

"For Delivery at Suspension Bridge.—Lump, $2.40 ; Lump and Nut, $2.35 ; and Run of Mines, $2.20.

"For Delivery at International Bridge.—Prices 15 cents a ton lower.

"The rate of freight subsequently indicated to the parties obtaining the awards was $1.10 a ton to Buffalo and an addition of 15 and 30 cents a ton to the International and Suspension Bridges respectively, thus advancing the rates from Buffalo to the bridges over last year, while at the same time compelling the coal operators to bid at the same price at which the great bulk of coal was taken last year—in other words, making a combination between the railroads, each taking the excess in rate from the coal.

"Again, while all parties were compelled to bid at the figures as stated above, the Board of Control held a meeting at the Windsor Hotel, at Montreal, pending the awards, and determined that certain coals on the river division of the Alleghany Valley Railroad and in Mercer County, Pa., might be sold 10 cents a ton less than coals from Reynoldsville, and that the Daques coal owned by the Erie might be sold 20 cents a ton less. This Board of Control further determined that Reynoldsville coal, for commercial and other purposes, should be sold in Buffalo at the prices fixed by them, with a freight of $1.40 a ton, provided the producers would agree to sell at those prices. The schedule was fixed also for delivery at the International and Suspension Bridges, Rochester, and Charlotte, no price being fixed for lake shipments.

"Well-authenticated rumors were current in the corridors of the Windsor Hotel, Montreal, that the officials of the railroads would, if necessary to carry out their scheme, decline to allow the cars of other roads to be hauled over their lines, or would require transfer at their terminus, in addition to the abrogation of through and the enforcement of local and arbitrary rates for freight on the coal supplied by the operators who might decline to be taken by the throat and conduct their business on the hard and fast lines laid down by the railroads to crush out all independent production, and thus throw all the bituminous coal business into the hands of the monopoly sought to be built up by the railroads."

It is said the Vanderbilt Beech Creek Mines are producing from 1600 to 2000 tons of coal a day. This coal is outside of the pool.

The Elk Garden Company has contracted for the coaling of the next voyage of the City of Rome at, it is said, $3.10 a ton.

When Clearfield coal first came upon the market, Cumberland operators, who had controlled the bituminous trade for years, did all they could to decry it. This coal had come to secure a market and to stay. The result was, that the price of Clearfield was put unnecessarily low. It secured a large amount of trade, and threatened to rule the market. Cumberland lost its trade, and had to drop its prices to meet the competition. This piece of not very ancient history may be of interest to the companies that are now decrying some of the new coals in this market.

The New York Central contracts will probably be awarded early next week.

Proposals for 300 tons Clearfield coal are asked for by the Camden Water Department, Philadelphia.

Gas-coals are very scarce, owing to the Pittsburg strikes, and Nova Scotia or any other kind of gas-coal is acceptable.

# NEW YORK MINING STOCKS.

## DIVIDEND-PAYING MINES.

| NAME AND LOCATION OF COMPANY. | HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. | | | | | | | | | | | | SALES. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | March 21. | | March 23. | | March 24. | | March 25. | | March 26. | | March 27. | | |
| | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | |
| Alice, Mon. | | | | | | | | | 1.90 | | 1.90 | | 200 |
| Amie Con., Co. | | | | | | | | | | | | | |
| Argenta | | | | | | | | | | | | | |
| Bassick, Co. | | | | | | | | | 3.00 | | | | 350 |
| Belle Isle, Ne. | | | | | .21 | | | | | | | | 400 |
| Bodie Cons., Ca. | | | 2.35 | | 2.35 | | | | | | | | 200 |
| Breece, Co. | | | | | | | | | | | | | |
| Bulwer, Ca. | .49 | .45 | .50 | .45 | .46 | | .37 | | .38 | | .40 | | 4,466 |
| California, Ne. | | | | | | | | | | | | | |
| Cal. & Hecla, Mich. | | | | | | | | | | | | | |
| Castle Creek | | | | | | | | | | | | | |
| Chollar | | | | | | | | | | | | | |
| Chrysolite, Co. | | | | | | | | | | | | | |
| Cons. Cal. & Va., Ne. | | | .40 | | .40 | | .43 | .40 | .42 | .41 | .45 | .44 | 9,400 |
| Cons. Va., Ne. | | | | | | | | | | | | | |
| Dunkin, Co. | | | | | | | | | | | | | |
| Eureka Cons., Ne. | | | | | | | 4.25 | 4.10 | 4.25 | 4.15 | 3.95 | 3.90 | 450 |
| Father de Smet, Dk. | | | | | | | | | | | | | |
| Findley, Ga. | | | | | | | | | | | | | |
| Gold Stripe, Ca. | | | | | | | | | .04 | | | | 1,000 |
| Gould & Curry, Ne. | .85 | | | | | | | | | | | | 300 |
| Grand Prize, Ne. | | | | | | | | | | | | | |
| Green Mountain, Ca. | | | | | | | | | | | | | |
| Hale & Norcross, Ne. | | | | | | | | | | | 6.38 | | 100 |
| Hall-Anderson, N. S. | | | | | | | | | | | | | |
| Homestake, Dk. | | | 10.25 | | | | 10 75 | | | | | | 127 |
| Horn-Silver, Ut. | | | 2.45 | | 2.50 | 2.45 | 2.50 | 2 35 | 2.40 | 2 35 | 2.35 | 2.30 | 2,100 |
| Independence, Ne. | | | | | | | | | | | | | |
| Iron Silver, Co. | | | | | 1.10 | | | | 1.10 | | 1.10 | | 400 |
| Leadville C., Co. | | | | | | | | | | | | | |
| Little Chief, Co. | | | | | | | | | | | .24 | .23 | 1,000 |
| Little Pittsburg, Co. | | | | | | | | | | | | | |
| Martin White, Ne. | | | | | | | | | | | | | |
| Moulton | | | | | | | | | | | | | |
| Navajo, Ne. | | | | | | | | | | | | | |
| Northern Belle | | | | | | | | | | | | | |
| North Belle Isle, Ne. | | | | | | | | | | | | | |
| Ontario, Ut. | 17.38 | | | | | | | | | | | | 25 |
| Ophir | | | | | | | | | | | | | |
| Plymouth | | | 16.25 | | 16.50 | 16.25 | 16 50 | 16.38 | 16.63 | 16.50 | 16.63 | 16.50 | 1,100 |
| Quicksilver Pref., Ca. | | | | | | | | | | | | | |
| " Com., Ca. | | | | | | | 4 00 | 3.75 | | | | | 150 |
| Robinson Cons., Co. | .30 | | | | | | .30 | | | | | | 300 |
| Savage, Ne. | | | | | | | | | | | | | |
| Sierra Nevada, Ne. | .45 | | .45 | | | | | | | | .65 | | 600 |
| Silver King, Ar. | | | | | 4.00 | | | | 3 50 | | | | 125 |
| Spring Valley, Ca. | | | | | | | | | | | | | |
| Standard, Ca. | 1.20 | 1.15 | | | | | 1.30 | 1 25 | 1 50 | 1 35 | 1.40 | 1.20 | 6,300 |
| Stormont, Ut. | | | | | | | | | | | | | |
| Tip Top, Ar. | | | | | | | | | | | | | |
| Yellow Jacket | | | | | | | | | | | | | |

## NON-DIVIDEND-PAYING MINES.

| NAME AND LOCATION OF COMPANY. | HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. | | | | | | | | | | | | SALES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | March 21. | | March 23. | | March 24. | | March 25. | | March 26. | | March 27. | | |
| | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | H. | L. | |
| Albion | | | | | | | | | | .10 | | | 600 |
| Alta | .30 | .25 | | | .25 | .20 | .16 | .15 | | | | | 1,800 |
| Barcelona, g. | | | | | | | | | | .10 | | | 500 |
| Bechtel Con., g. | | | | | | | | | | | | | |
| Belvidere | | | | | | | | | | | | | |
| Best & B'licher, g. s. | | | | | | | | | | | | | |
| Big Pittsburg, s. l. | | | | | | | | | | | | | |
| Bradshaw, s. | | | | | | | | | | | | | |
| Bull-Domingo, s. l. | | | | | | | | | | | | | |
| Cal., B. H., g. | | | | | | | | | | | .87 | .85 | 400 |
| Central Ariz'na, s. | | | | | | | 20 | | | .20 | .20 | | 700 |
| Climax, Co. | | | | | | | | | | | | | |
| Colorado Central. | | | | | | | | | | | | | |
| Cons. Imperial. | | | | | | | | | | | | | |
| Con. Pacific | | | .85 | .60 | .60 | | .65 | .64 | .66 | .64 | .70 | .65 | 3,600 |
| Dahlonega | | | | | | | | | | | | | |
| Decatur | | | | | | | | | | | | | |
| Durango, g. | | | | | | | | | | | | | |
| Eastern Oregon | | | | | | | | | | | | | |
| Goodshaw, g. | | | | | | | | | | | | | |
| Harlem M. & M. Co. | | | | | | | | | | | | | |
| Hortense, s. | | | | | | | | | | | | | |
| Kossuth | | | | | | | | | | | .07 | | 200 |
| Lacrosse, g. | | | | | | | | | | .10 | | | 500 |
| Mariposa Pref., g. | | | | | | | | | | | | | |
| " Com., g. | | | | | | | | | | | | | |
| Mexican, g. s. | | | | | | | | | | | | | |
| Mono | | | | | | | | | | | | | |
| New Pittsburg | | | | | | | | | | | | | |
| Noonday | | | | | | | | | | | | | |
| North Standard, g. | | | | | | | | | | | | | |
| N. Horn-Silv'r, s. l. | | | | | | | | | | | | | |
| Ori'nt'l & Miller, s. | | | | | | | | | | .11 | | | 100 |
| Rappahannock, g. | | | | | | | | | | | | | |
| Red Elephant, s. | | | | | | | | | | | | | |
| Ruby, of Arizona | | | | | | | | | | | | | |
| Silver Cliff, s. | | | | | | | | | | | | | |
| Sonora Con. | | | | | | | | | | | | | |
| South Bodie, g. | | | | | | | | | | | | | |
| South Bulwer, g. | | | | | | | | | | | | | |
| South Hite | | | | | | | | | | | | | |
| South Pacific | | | | | | | | | | | | | |
| State Line, 1 & 4, s. | | | | | | | | | | | | | |
| " Nos. 2 & 3, s. | | | | | | | | | | | | | |
| Sutro Tunnel | .13 | | .14 | .13 | .14 | | .14 | | .14 | | .15 | | 13,800 |
| Taylor Plumas | | | | | | | | | | | | | |
| Tioga | | | | | | | | | | | | | |
| Unadilla, s. | | | | | | | | | | | | | |
| Union Cons., g. s. | | | | | | | | | | | .55 | | 100 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

Tables giving dividends and assessments will be printed the first week of each month. Dividend shares sold, 29,093. Non-dividend shares sold, 22,300.

**Philadelphia.** March 27.

[From our Special Correspondent.]

The anthracite coal trade is dull, simply because the harbors and rivers are full of ice, and the spring rates have not been fixed. The coal men here are waiting anxiously for the word "go." The condition of every market, East, West, and South, is exactly known, and probabilities have been pretty carefully discounted. There are more expressions of confidence this week. The company representatives think they see a long way ahead, and argue that more coal is used now than last year, and refer to statistics of the coal trade for proof. Every thing is ready at Cooper's Point. Arrangements have been closed by a good many shippers for tonnage, and vessels are wanted to-day for the delivery of coal all along the Atlantic coast. The Western demand, our leading coal men think, will help us out of any downward tendency. The coal trade to-day is in good shape. Stove sizes are rather lower. The local demand continues active. The line trade will respond favorably in due time. Southern orders or inquiries are in hand, and terms have been made substantially. Were a general improvement to take place in manufacturing, the entire situation would change. Even as it is, it is questionable whether the April allotment will see us through.

The soft coal trade is, as usual, devoid of interest. Some sales have been made below pool rates of certain coals that have a reputation to make, and even an acquaintance to create. The production for the week was 64,974 tons; for the year, 669,053 tons, against 58,030 tons and 605,234 tons for the corresponding periods last year. There is a strong probability that the soft coal interests will be heard before the Legislature on anti-discrimination.

**Buffalo.** March 26.

[From our Special Correspondent.]

Local trade in anthracite and bituminous coal is active, and prices not quotably different.

From a circular that came to hand this forenoon, I find that, during April, Connellsville foundry coke, delivered on board cars at ovens, will be sold at $1.40 per 2000 pounds; cash settlements to be made on the 15th of each month for shipments of the preceding month.

It being always very difficult to obtain any information from our dealers relative to the coal trade, the following particulars relative to the Grand Trunk awards, taken from the Montreal *Gazette*, bears upon its face such marks of truthfulness, taken in connection with the rumors afloat here, that it may be really deemed official:

"Last Saturday night, Mr. Joseph Hickson awarded the contracts for the supply of the 375,000 tons of coal required by the Grand Trunk Railroad Company. Of this amount, 250,000 tons are to be delivered at the Suspension and International bridges, 55,000 at Detroit, 20,000 at Sarnia, 20,000 at Brockville, and 30,000 at Portland, Me. The contracts for the supply at Niagara were awarded as follows: 80,000 tons to Messrs. Bell, Lewis & Yates of Buffalo; 130,000 to the New York, Lake Erie & Western Railroad; and 20,000 to the Rochester & Pittsburg Railroad. The coal to be delivered at the International Bridge was sold at the following rates: Lump, $2.25; Lump and Nut, $2.20; Run of Mine, $2.05. At the Suspension Bridge, the same kinds of coal fetched $2.40, $2.35, and $2.20 respectively. The Detroit and Sarnia contract was awarded to the Cleveland, Lorain & Wheeling Railroad. The prices were $2.05 at Detroit and $2.20 at Sarnia. The coal for Brockville is to be furnished by Messrs. Bell, Lewis & Yates at $3.50, while the contract for Portland, Me., was secured by the Chesapeake & Ohio Coal Company at $3.50.

"All the coal shipped over the Lake Erie and Rochester & Pittsburg railroads is controlled by Messrs. Bell, Lewis & Yates, the largest coal producers in the States, who have thus virtually received the contract for 250,000 tons out of the whole 375,000. Over 100 tenders were submitted, from which Mr. Hickson had to make a selection.

"The price of the coal was fixed by a board of commissioners, consisting of Mr. George H. Lewis and Ensign Bennett, of Buffalo, and Mr. Samuel Hines, of Scranton, Pa., who were appointed by the Lake Erie, Rochester & Pittsburg, and Buffalo, New York & Philadelphia railroads, together with all the shippers over all the roads. An agreement was entered into by all the parties present to the effect that the railroad companies should not fix freight rates at present, but wait till after the Grand Trunk contracts were awarded, and if any bidder should offer coal at a price less than that fixed by the commissioners, the railroads would impose such freight rates on them as would render it impossible for them to carry out their contract. A convention of coal miners and shippers has been in session here for the past week, and has established the price of soft coal, which will control the sale during the year."

It is reported, unofficially, that $1.80 per ton is the price at which coal will be delivered to the New York Central Railroad during the present year. Perhaps by next week, the full details may be made known.

Application has been made to the Common Council here to have a city ordinance passed making it imperative for coal dealers to furnish with each load a card bearing the weight of the coal and the wagon containing it; further, that any person shall have power to compel said coal and wagon to be weighed. There is a law like this in England.

Doubtless you will publish the schedule of prices for the opening of the season's coal trade as fixed by the Western Association of Anthracite Shippers yesterday; therefore I leave the subject in your hands.

A correspondent of a local paper, writing from Philadelphia, says: "A large movement of coal is expected to go Westward by the cars and lake, and the railroad companies are making every effort to meet the movement. *Navigation is expected to be open at an early day*, and the Western prices will be fixed on Wednesday next; after that, shipments will be large." This correspondent evidently does not understand the situation; for he would not thus display such an extraordinary amount of ignorance, if he did. In addition to what I wrote you last week, let him consider the following item: The ice is from 24 to 36 inches thick on Sodus Bay, Lake Ontario, this winter; the range of vision from the bluff can not be less than thirty miles, and not a sign of water meets the eye, and some of the icebergs along the shore at that point under the bluff are 50 feet high!

The coal docks of the Ohio Central and the Northwestern Fuel Company, at Duluth, Minn., are nearly empty, and probably will be entirely so before navigation opens. The severe cold weather upset the calculations of the companies, and they will doubtless provide larger supplies this year, and thus another factor for increased consumption is made manifest.

Port Arthur, Lake Superior, is the scene of great activity in consequence of the construction of a breakwater 2000 feet in length, which will afford protection to the coal-laden vessels that enter there during the season.

**Boston.** March 26.

[From our Special Correspondent.]

There is not much doing in anthracite coal. Prices are nominally unchanged, but little business is looked for until April circulars are out. Most of the companies have had ten days' restriction this month under the allotment plan, and its wisdom has been fully shown. Production should not be allowed to drift in April regardless of any allotment, as it has been intimated would be the case. Trade has also been hindered by the continued cold weather, which prevents prompt dispatch and makes it no object to place orders at present.

We quote f. o. b. prices as follows:

At New York, Stove, $4; Egg, $3.20; Broken, $3.10@$3.20; Pea, $2@$2.25; Nut, $3.35@$3.50. At Philadelphia, $3.90@$4 for Stove; $3.15 for Egg; $1.85@$1.95 for Pea; $2.95@$3.05 for Broken. Special coals, $4.75@$5 for Broken, $5.35@$5.50 for Stove.

In the bituminous branch, quite a number of small contracts are taken, but we hear of no large contracts. There seems to be no risk in buying now, as coal is extremely low and there are no expectations of any decline. Matters concerning the pool are unchanged. We hear of no open charges that its regulations are violated. It is a fact causing some comment that the firm that is conspicuous for its success in securing large Cumberland contracts, has facilities for shipping over both the Pennsylvania and Baltimore & Ohio roads. Thus far, the total Cumberland sales in this market have been materially increased over last year.

We quote cargo lots bituminous at $3.70@$3.75 delivered.

The contract prices for gas-coal having been made in New York, are now looked for in this market. On the basis of $4 in New York, we look for a decline of 25 cents here from last season's figures. Some sales are understood to have been made by Boston parties to Sound ports. The decline is understood to be necessary chiefly to aid in the contest against water-gas, which uses anthracite instead of gas-coal, and only a little of that, say one fourth as much.

There is a decided weakening in freights, and $1 is obtained from New York. We quote:

New York, $1@$1.10; Philadelphia, $1.30; Baltimore, $1.35@$1.40; Newport News, $1.35; Richmond, $1.30@$1.40; Cape Breton, —@—; Bay of Fundy, —@—.

There is an active retail trade, but stocks are light and dealers continue to help one another out. Nevertheless, prices are unchanged at low figures, which pay hardly more than the cost of teaming and delivering. We quote:

| | |
|---|---|
| White ash, furnace and egg | $5.25@$5.75 |
| " " stove and nut | 5 50@ 6.00 |
| Shamokin, egg | 6 00@ 6.25 |
| " stove | 6.25@ 6.50 |
| Lorberry, egg and stove | 6.50@ 7.00 |
| Franklin, egg and stove | 7 50 |
| Lehigh, furnace, egg, and stove | 5.50@ 6.00 |
| " nut | 5.75@ 6.50 |

Wharf prices: Stove, $5; Broken and Egg, $4.75.

**Ohio.** March 24.

[From our Traveling Correspondent.]

The continued cold weather has made March one of the best of months for the coal dealers, and added a large amount to the usual gross output of the mines. The labor troubles, except a few local disputes, have not seriously interfered with operations. The mines in the Mahoning District are mining at 55 cents a ton; in the Massillon District, at 75 cents. There is a strike at Elm Run mine, because certain men were discharged. At Goshen, the price is 60 cents; and at Wheeling Creek mines, 50 cents has been the price since January. In the Hocking Valley, the Columbus, Hocking Valley & Toledo Railroad is transporting an average of 400 or more cars a day, mined at 50 cents a ton, and the Columbus & Hocking Coal and Iron Company last week started its Akron furnace at Buchtel, the coal for which is mined at 40 cents a ton by the men who were lately striking against 60 cents a ton. Another furnace will probably be started soon under similar conditions. The strike in the Pittsburg District is helping the Hocking Valley people; and if it should continue for any considerable time, will enable the Hocking Valley to get back some of the trade that Pittsburg gained from them last year. The railroad company has not been able to furnish all the cars called for, and is having a new lot made. Altogether, the outlook in the Hocking is very hopeful just now.

The Pittsburg & Wheeling Coal and Coke Company, office No. 28 Merchants' Bank Building, Cleveland, carried off the plum in the award of the contract for supplying the Western division of the Grand Trunk Railroad, Messrs. Bell, Lewis & Yates having secured the contract for the Eastern portion. I have not been able to learn the price, but presume it is fair to assume that it is low enough. Judging from the appearance of Lake Erie, the opening of navigation is farther off now than in the middle of January. There is but little probability of any cargoes going on the lake before the middle of May, which will make navigation, like the business of 1885, late in showing up. But notwithstanding the croakers and the actual dullness, business is slowly but surely improving. One of the most hopeful signs that I see is the fact that large manufacturers and operators have abandoned the policy of trying to force sales. The policy of waiting for trade to develop can not help but bring about a firmer tone, and have a tendency to strengthen prices—two very essential elements for growing prosperity. Just now, nearly every body but the retail coal dealers seems to be waiting and anxious for spring.

## STATISTICS OF COAL PRODUCTION.

**Comparative statement of the production of anthracite coal for the week ended March 21st, and year from January 1st:**

| TONS OF 2240 LBS. | 1885. | | 1884. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| D. & H. Canal Co. | 42,681 | 587,158 | 43,585 | 611,958 |
| D., L. & W. RR. Co. | 73,370 | 769,836 | 62,137 | 896,967 |
| Penna. Coal Co. | 9,301 | 217,600 | 12,538 | 183,172 |
| L. V. RR. Co. | 87,930 | 972,261 | 72,275 | 1,070,023 |
| Penna. RR.: | | | | |
| North & West Br. RR. | 19,189 | 232,067 | 18,801 | 177,165 |
| S. H. & W. B. RR. | 2,419 | 26,719 | 3,983 | 42,844 |
| P. & R. RR. Co. | 196,090 | 1,859,498 | 141,483 | 1,830,285 |
| P. & N. Y. RR. | 4,449 | 71,761 | 7,063 | 91,170 |
| Total | 435,429 | 4,736,900 | 361,865 | 4,903,584 |
| Increase | | | | |
| Decrease | | 166,685 | | |

**The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.**

| | | |
|---|---|---|
| Total same time in 1880 | 4,322,961 | tons |
| " " " " 1881 | 5,565,210 | " |
| " " " " 1882 | 4,897,703 | " |
| " " " " 1883 | 5,616,217 | " |

*The increase in shipments of Cumberland Coal* over the Cumberland & Pennsylvania Railroad and branches amounts to 17,698 tons, as compared with the corresponding period of 1884.

**Comparative Statement of the Transportation of Coke** over the Pennsylvania Railroad for the week ended March 21st, and year from January 1st:

Tons of 2000 pounds.

| | 1885. | | 1884. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| Gallitzin & Mountain (Alleghany Region) | 3,667 | 41,506 | 2,629 | 30,441 |
| West Penn. RR. | 932 | 3,907 | 323 | 23,355 |
| Southwest Penn. RR | 35,932 | 401,972 | 43,399 | 478,732 |
| Penn. & Westmoreland Region, Pa. RR | 4,248 | 59,512 | 3,758 | 45,736 |
| Monongahela, Penn. RR. | 2,005 | 16,095 | 2,135 | 16,381 |
| Pittsburg Region, Pa. RR. | | | | 102 |
| Snow Shoe (Clearfield Region) | 235 | 3,837 | 513 | 5,874 |
| Total | 47,019 | 526,829 | 52,757 | 600,621 |
| Decrease | | 73,792 | | |

*Belvidere-Delaware Railroad Report for the week ended March 21st:*

| | Week. | Year 1885. | Year 1884. |
|---|---|---|---|
| Coal for shipment at Coal Port (Trenton) | 357 | 618 | 423 |
| Coal for shipment at South Amboy | 10,733 | 103,290 | 114,390 |
| Coal for distribution | 21,486 | 202,785 | 180,110 |
| Coal for company's use | 5,032 | 53,557 | 43,475 |
| Total | 37,608 | 360,250 | 338,398 |
| Increase | | | |
| Decrease | | 21,852 | |

**Comparative Statement of the Production of Bituminous Coal** for the week ended March 21st and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

| | 1885. | | 1884. | |
|---|---|---|---|---|
| | Week. | Year. | Week. | Year. |
| *Cumberland Region, Md.* | | | | |
| Tons of 2240 lbs. | 55,740 | 408,573 | 49,022 | 393,348 |
| *Barclay Region, Pa.* | | | | |
| Barclay RR., tons of 2240 lbs. | 6,568 | 62,842 | 9,567 | 81,479 |
| *Broad Top Region, Pa.* | | | | |
| Huntington & Broad Top RR., tons of 2240 lbs. | 3,840 | 34,334 | 3,937 | 42,322 |
| East Broad Top | | | | |
| *Clearfield Region, Pa.* | | | | |
| Snow Shoe | 4,730 | 48,703 | 4,870 | 57,217 |
| Karthaus (Keating) | 1,563 | 37,200 | 56,937 | 606,785 |
| Tyrone & Clearfield | 63,991 | 692,756 | | |
| *Alleghany Region, Pa* | | | | |
| Gallitzin & Mountain | 9,952 | 112,917 | 4,054 | 101,712 |
| Total Eastern and Northern shipments | 146,384 | 1,397,325 | 128,347 | 1,282,863 |

WESTERN SHIPMENTS.*

| | | | | |
|---|---|---|---|---|
| *Pittsburg Region, Pa.* | | | | |
| West Penn RR. | 5,092 | 55,903 | 5,025 | 78,951 |
| SouthwestPenn.RR. | 1,948 | 22,881 | 2,279 | 35,294 |
| Pennsylvania RR. | 4,379 | 50,628 | 4,611 | 61,654 |
| *Westmoreland Region, Pa.* | | | | |
| Pennsylvania RR. | 2,762 | 233,913 | 22,960 | 276,992 |
| *Monongahela Region, Pa.* | | | | |
| Pennsylvania RR. | 753 | 43,008 | 3,285 | 39,453 |
| Total Western shipments | 14,904 | 406,333 | 38,160 | 492,344 |
| Grand total | 161,288 | 1,803,658 | 166,507 | 1,775,207 |
| Increase | | 28,451 | | |

* Considerable gas-coal shipped East, of which no division is made in report

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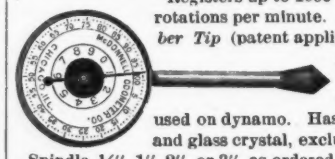

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Yours truly, WILLIAM HOOPER, Supt. of Mines.